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The Vital Question as to the Purity of the Thames and the Health of London.

IMPORTANT, and to many persons unexpected, light has been thrown on the interminable question of the disposal of organic refuse by the report which has just been presented to the Conservators of the River Thames by Captain Calver, R.N., F.R.S. It occasionally happens that questions arise of so serious a nature that men instinctively thrust them, as far as possible, aside. They take for granted that the reply will be as they wish, because the contrary answer would involve such trouble, cost, or mischief, that they gladly hold it to be incredible. Such has been the case in the present instance. Voices have been raised, which were entitled to respect from their tone, if not from their number, to ask, "Is it safe to turn the sewage of three millions of people into a tidal river?" Engineers familiar with the Continent have drawn evil auguries from the experience of Havre, of Marseilles, or of Naples. To our own expressions of fear we need not refer. But the notion that more than four millions and a half of money has been expended by the Metropolitan Board in the drainage of London in the absence of a full knowledge of the ultimate results of works which are held to be completed, is one of so ugly a complexion that it is small wonder if all those who rely on the continuance of existing municipal institutions should at once scout it from their thoughts.

Again and again, however, a serious question has been put on the subject. Again and again it has been met by a reply which, however satisfactory it may have proved to the Board, or even to the public, has always appeared to us to leave the last word unsaid. At length the conservators of the Thames have called in counsel from a source entirely independent of any engineering theory or influence. A captain of the Royal Navy, who is also a Fellow of the Royal Society, has examined the physical facts of the case, after the method proper to the hydrographer. And if he has not spoken with the same weight and detail as to the chemical question, it has not been from the fact that that question has yet been satisfactorily disposed of.

Captain Calver has adopted that double method of investigation which alone can be satisfactory in a question of such national importance. He has not contented himself with estimates and with arguments; he has sounded and measured the Thames. He has ascertained where, how, and how fast, the river is losing depth,—is, in fact, being filled up. He has compared the data thus arrived at with the quantities of solid matter which are, undeniably poured into the Thames from the discharge of the main drainage. He has thus arrived at conclusions the truth and value of which it is impossible safely to ignore.

In 1863-4 the main outfalls of the metropolitan drainage system were opened into the Thames. In 1867 a vessel grounded, on passing the mouth of the southern outfall, on a mud deposit, in a spot where 18 ft. or 19 ft. of water had run over a gravelly bottom before the opening of the outfalls. Periodical surveys, ordered by the conservators, have shown that a similar action is not confined to a restricted locality. The diminution of the depth of water is in progress at various points in the river, and occurs even above bridge. The first point, or the physical fact of the encumbrance of the channel of the river, is thus established.

The solid contents of the sewage of three and a half millions of people, apart from any question of salts or other compounds which may be held in chemical solution, and exclusive of soot, grease, road sweepings, and other elements which require daily removal, either above or underground, may be taken at a minimum of 90,000 tons per annum. If we allow extraneous matter to enter into the sewers to only an equal amount, we shall find that materials for a very serious amount of deposit are steadily in progress of contribution. Since the opening of the main drainage works this amount cannot be put at less than two and a half millions of tons of solid matter; and that estimate is probably very far under the mark. It may be replied that it is not a matter of very formidable difficulty to remove 180,000 tons per annum from the Thames by dredging. If twopence per ton be allowed as the cost of so doing, the outlay would not exceed 15,000*l.* per annum. This the Conservators of the Thames, by the force of the Thames Navigation Act of 1870, appear to have the power to call upon the Metropolitan Board to perform. This, then, it may be urged, is the worst of the matter,—look at it how we may.

Then, however, comes in the chemical question. We have spoken of the matter accumulating in the bed of the Thames as if it were harmless silt or mud; something that if we dredge up we can use,—or, at all events, put in some other place without involving any further trouble. But it appears that Dr. Williamson, Professor of Chemistry at University College, London, has tested thirteen samples of this mud taken from the vicinity of the outfall, and three taken from Woolwich Reach, and that these analyses, as well as others made during the present year, show that there is a large amount of sewage contamination in this deposited mud.

It may be remembered that in a discussion of the paper read by Mr. Norman Bazalgette on the sewage question at the Institution of Civil Engineers in the month of February last, the case of the Metropolitan Board was defended by a Queen's Counsel. But the figures then cited by this gentleman, Mr. Littler, Q.C., from the statistics of the Metropolitan Board, had the inconvenience, if they proved anything, of proving too much. "Between 1866," urged the learned Counsel, "when the Metropolitan Board poured the sewage in at Crossness, and 1868, there had been a decrease in the deposit of 480,000 cubic yards. From 1868 to 1869 there appeared to have been an increase of 142,000 cubic yards; from 1869 to 1870 a decrease of 216,000 cubic yards; from 1870 to 1871 an increase of 277,000 cubic yards; and the following year an increase of 279,000 cubic yards. Then, oddly enough, in the next year there was a decrease of 260,000 cubic yards; clearly showing that it was owing to accidental causes, not the constant one, sewage, but other causes." As the balance of these figures gives a decrease of 264,000 cubic yards of deposit, the due inference of the argument would seem to be that the discharge of a large quantity of sewage into the river has the effect of deepening and improving the channel.

The portion of the bed of the river, however, which was referred to in this account is stated at a length of about three-fourths of a mile. What we find, then, if the figures are reliable, to be the fact is, that over this small portion of the Thames an amount of sewage-contaminated mud, which very nearly corresponds with the annual contribution which we before estimated as a minimum, is travelling up and down the river, according to the variations of wind, tides, and currents; at times accumulating in one particular stretch of the river, and at times making its way to foul the stream elsewhere. Mr. Littler added,—"The question whether or not the sewage was filling up the river was one that could only be dealt with by ascertaining, over a long distance of the reach from Crossness downwards, whether there was an increase of silt, and an increase of sewage deposit." Had the learned gentleman said upwards as well as downwards he would have offered a very good introductory preface to the report of Captain Calver.

Another point which has been overlooked by the advocates of the wholesale pollution of rivers is brought out clearly by Captain Calver. A natural river bottom consists, in most cases, of light and inadhesive materials. A certain depth of these materials is in a constant state of motion. It travels now up, now down, the course of the stream, under the influence of tide and current, and according to the force and the direction of the winds, and the impetuosity of the land floods. But the mean general progress is towards the sea. If, however, the bed of the river be composed of an adhesive material, such as sewage mud, the case is different. Such a material attaches a certain portion of its substance to the channel at each point of its movement. "The matter carried up by the flood falls and sticks sufficiently to render it inde-

pendent of the next recurrence of the downward scour, and it is, by consequence, moved up afterwards along the channel stage by stage." It should have been stated that this movement must rather depend on the maximum scour of the water, whether upward or downward, than on any other cause yet pointed out. We see no reason why the mud that resists the downward scour should yield to an upward tide, unless the tide, for at least a portion of its course, were more impetuous. This, we shall presently show, is stated on very high authority to be the case. There may also be some difference in the specific gravity of the ebbing and flowing water, that coming upwards from the sea being more salt, and thus seeking the bottom of the channel, and in consequence of its greater specific gravity, ploughing up the silt more deeply than the down-running fresh water can do. This, however, we only throw out as a suggestion. The true state of the case can only be definitively settled by the hydrographer and by the chemist after further examination than has yet been made. It is as in possession of the facts hitherto ascertained, both by survey and by analysis, that Capt. Calver tells us that, in point of fact, the sewage mud is creeping up the channel of the Thames, and contaminating the river even above Bridge. "As matters now stand," says the Report, "the metropolitan sewage discharge has reproduced in mid-Thames, in an aggravated form, a nuisance that was felt to be unbearable in the upper portion of the river. Formerly, the sewers of London discharged their contents into the river at low water; and this, Sir Joseph Bazalgette has pointed out, was most injurious, because it was carried by the rising tide up the river, to be brought to London by the following ebb tide; then to mix with each day's past supply, the progress of many days' accumulation towards the sea being almost imperceptible. This exactly describes the existing state of things in mid-Thames; both as respects the accumulation of sewage, its daily oscillation, and its slow progress sea-ward." Taking the estimate of Sir Joseph Bazalgette to the effect that the sewage-matter contained in the Thames moves sea-ward at the rate of five miles in a fortnight, it is evident that the daily contribution of 120 millions of gallons of sewage must be producing a slow daily aggravation of foulness which must ultimately become a source of intolerable danger.

In fact, it is no use to beat about the bush. The question is not one of a few hundred thousand yards of mud more or less, or even of a temporary or strictly local nuisance. It is something much more serious; something with which every sanitary authority will have to reckon. Something which is as hostile to the plans now in course of adoption at the mouth of the Clyde, at Bournemouth, and in other places, as it is at London. It is a fact which is not new, but to which some engineers have persistently shut their eyes. It is a fact which may be long ignored, but which will, if still ignored, one day assert its presence by terrible calamity. It is the simple, certain, awkward fact that if sewage is poured into water, still or running, fresh or salt, the water does not oxidise the sewage, but the sewage poisons the water. This is the primary law of the case: everything else is matter of time and of detail.

From this primary fact we can see no escape whatever by the mere theory of dilution. Our inland rivers would not have become the sources of anxiety which they now so frequently are, if water would have parted with the oxygen, which it holds in so firm an embrace, in order to allow it to combine with extraneous floating matter. It is, as we have often insisted, only from the atmosphere that the oxygen necessary for the purpose can be obtained; unless, indeed, we supply it by some chemical agent, as in the case of Condy's fluid. And that oxygen is to be obtained from the atmosphere only either by spreading out a thin sheet of fluid over an infinite network of points and facets, as in the case of filtration through the earth, especially through a sandy soil; or, when the supply is too concentrated and too abundant thus to be dealt with, by submitting the organic matter to actual combustion, for which process, indeed, it mostly supplies the fuel.

If it be true, as the analysts tell us, as the River Pollution Commissioners tell us, as Capt. Calver tells us, as every one who has impartially studied the subject tells us, that sewage cannot be oxidised by the simple procedure of throwing it into water, it is high time that the fact should be laid down as a primary canon of sanitary work. If there be anything to be urged *per contra*, now is the time for it to be done. If any inventor will discover a cheap, ready, and certain mode of obtaining from water the oxygen which is required to destroy the pestilent poison of sewage, he will be entitled to what honour the nation can do to its benefactor, as well as to the large amount of wealth that will no doubt flow into his pockets. But it is high time that this matter should be once for all understood. On the authority of such a report as that of Capt. Calver, it is now possible to say something which all vested interests would have combined to burke had it been uttered a few months since. But the man who thinks to become rich by shifting his money from one pocket to another, is a sage compared to those who seek to secure the public health by forbidding small contributions of unclean matter to be thrown into our river channels, in order that enormous masses of the same may be poured into them just at that portion of the course which ensures an upward as well as a downward travel.

We said that a high authority was to be cited as to the fact of the travel of this sewage-mud up the channel of the Thames. It is that of no less distinguished a person than the Astronomer Royal. A paper in the "Philosophical Transactions" of 1849, contains the result of a set of observations made by that gentleman of the rise and fall of the tides at Deptford for a month. In the spring half of the tides the average duration of the flow was five tidal hours, and that of the ebb seven hours. Sir George Airey goes on to say that he thought it might be taken for granted that the velocity of the water is nearly proportional, that of the flow being to that of the ebb as seven to five. This would make the transporting power of the former eightfold that of the latter; so that if the ebb-tide was strong enough to move a pebble weighing one ounce, the flowing tide would move a pebble weighing eight ounces.

Without disputing for a moment either the observations, or the mathematics, of the Astronomer Royal, it is clear that they prove too much, unless they are subjected to the control of more practical engineering knowledge. Allowing, as the Astronomer Royal does, that in neap tides the case would be somewhat different, it would yet follow that there would be a steady movement up the channel of the Thames of what is commonly known as the ballast that covers great part of its bottom. No such phenomenon is known to occur. Two elements of importance have been apparently overlooked by Sir G. Airey. One is that of the volume of the river itself, by which quantity the outgoing tide always exceeds the incoming tide in magnitude. The other is the fact, only recently proved by measurements of the great rivers of America, although known to hydrographers from the survey of the Dardanelles and of the Straits of Gibraltar, that the surface of a tide or a current affords no sure indication of the movement of the water below. This can only be ascertained by direct measurement in each case. It is not to be arrived at by formulæ. It is possible that an under-current of water may be running seaward in parts of the Thames at the very moment that the surface of the same part of the stream is flowing up the channel. We do not say that this is the case,—but it is a point yet to be ascertained.

Enough weight, however, is due to the remarks of Sir G. Airey, even under this control, to show that a steady upward travel of sewage-mud from Crossness to above Battersea is not only possible, but probable. Examination of the river-mud, Capt. Calver tells us, shows that it is actually the case. We are thus driven to look at the question of the limits of safety. Is all this theoretically true, but practically unimportant, or is it a vital question?

The sewage pumped into the Thames by the metropolitan drainage works amounts to about 120 millions of gallons per diem. This, according to Mr. Redman's report (Minutes of Proceedings of the Institution of Civil Engineers, March 27, 1877) amounts to one-fourth of the actual outflow of the Thames. Supposing, then, that this quantity of sewage mixed with the down-flowing river, and made its way uninterruptedly to the sea, the Thames below Crossness would be a dilution of sewage consisting of three parts water and one part sewage. It is the estimate of Capt. Calver that 432,412,000 cubic feet, or twenty-two days' discharge, represents an aggregate amount of sewage which is continually oscillating up and down a section of the river of eight miles in length. This is based on a calculation of Sir Joseph Bazalgette and Capt. Burstal that the sewage matter poured into the Thames moves seaward at the rate of about five miles in a fortnight. We do not quite follow the argument. Capt. Calver takes the sewage at one-fifth of the volume of the river, instead of one-fourth according to Mr. Redman. But if this volume of sewage, or any assignable part of it, occupies twenty-two days in flowing eight miles, there must in that time be twenty-two fifths of the daily volume of the river to be dealt with. The accumulation, in this case, would seem to be in excess. Without, however, going further into these difficult questions of the oscillating section, of the floating of the sewage matter, and of its gradual increase in foulness, it is evident that if we find that the incoming tide sweeps under London Bridge a flood consisting of one-fourth, one-fifth, or even one-tenth, of the actual sewage, we are approaching a state of things far more dangerous than was that which drove London to encounter the expense of between four and five millions sterling in order to ameliorate it.

Captain Calver's report allows to the Metropolitan Board a *locus penitentiæ*, of which they will probably endeavour to take advantage; although it cannot avail to justify recent proposals for turning the sewage of other places into water,—fresh or salt. Mr. Rawlinson is cited as having expressed the opinion that the Metropolitan Board never contemplated the permanence of the present state of things, and were all along perfectly aware that the sewage must ultimately be kept out of the Thames. This being the case, the remarkable silence of the Board and their advisers has been a great injury, if not to the inhabitants of London, at least to those rural residents who have been taught to look to the Metropolitan Works as an example of sanitary engineering in every respect to be copied. Much of the large sums borrowed by various Urban and Rural Sanitary Authorities throughout the country is, we fear, in course of outlay under this impression.

The general conclusions, and the recommendation of Captain Calver, deal directly with that question on which he was directed to report, namely, the maintenance of the channel of the Thames. To London, as a commercial emporium, that question is one of primary importance. It is one rightly to be taken up by the conservators of the river,—a body of men who, however recent their actual Parliamentary authority, represent the ancient watchers over the very commercial existence of the City. But the direct amount of obstruction is, as we hope we have shown, but a very small part of the momentous question now forced into the light of day. A quarter of a million tons of mud, more or less, to be removed from a river-bed in a year, is not a very formidable matter for the mother port of England. A contamination of the Thames at a point six miles below London to the extent of one-fifth part of its volume, a contamination which each successive flood brings more and more undilutedly to London itself, is a matter that concerns, not the wealth only, but the health of the metropolis. It is impossible to blink the subject. It will be dangerous to palter with it. It would be treachery to the cause of the public health to be silent. After long and tedious inquiry, repeated Commissions, repeated debates in Parliament, we have passed a law to prevent the contamination of our rivers, on the ground that it is an invitation to pestilence to continue to convert them into running sewers. And side by side with this legislation we show to the world the spectacle of the largest and most important quasi-municipal body in the kingdom, furnished by Parliament with wide powers, raising an enormous income from taxation, dealing with many millions of public money, and all this with the upshot of pouring into the Thames, some six miles below London, the concentrated sewage of the whole vast population of the metropolis. And it has taken thirteen years to find out the mischief that is being done.

Lambeth Palace Library.—The Ecclesiastical Commissioners have lately provided for the arrangement and repair of a vast number of rare documents relating to the see of Canterbury, from the time of Henry III. downwards. They contain much information on the customs of manors and local history. The whole contents of the archiepiscopal library, which is open three days a week, will now be available for reference.

A TREATISE ON PORTLAND CEMENT.

IT is one exemplification of the rapid increase in the use of Portland cement of late years, and the importance that has come to be attached to it as a constructive material, that this, which not so long ago used to be mentioned casually in practical treatises as one among other mortars, should now be thought worth a large volume to itself, in illustration of its history and the methods of compounding and using it.*

"The Eddystone lighthouse," says Mr. Reid, "is the foundation upon which our knowledge of hydraulic mortars has been erected, and is the chief pillar of modern architecture." The latter expression would be more correct if he had said "of modern *building*,"—distinguishing construction from design. But it is no doubt true that Smeaton's unwearied and conscientious experiments in the search after a reliable mortar for his famous structure, first led to anything like a system in regard to the compounding of hydraulic cement,—"lightened up the darkness surrounding the subject of mortars," as the author (who is a little too much given to "talk dictionary") expresses it in his introductory chapter. The book is accordingly dedicated to the memory of Smeaton, whose fine countenance, at once shrewd and benevolent, appears as frontispiece to the introduction. It is somewhat singular that a book, written in connexion with these studies of Smeaton's, should appear just about the same time that we hear of the intended demolition of the structure for which those very experiments were made. There is none the less honour to Smeaton, however, whose lighthouse is to be removed through no defect in his engineering, but through the threatened giving way of its rock foundations, and the necessity for a structure that will accommodate an improved lighting apparatus.

Smeaton discovered, by close attention to the numerous experiments which he carried on with very primitive chemical means, that the limes which were not pure carbonates, but contained an admixture of earthy matter, were those which hardened best, or at all, under water. His test, after experimenting on the indurating qualities of small balls of different limes, kneaded up while soft, and left to harden in water, was, to apply an acid which dissolved the calcareous matter. The specimens made from chalk and Plymouth marble dissolved entirely under this test; that from the Aberthaw limestone, which had behaved best in the way of hardening, left a deposit of earthy matter. It was thus that Smeaton came to the conclusion that these impure limes produced the best results, though it is rather too much to say that he had thus "unlocked the secret of hydraulicity." He had discovered the conditions under which hydraulic qualities, or the power of setting under water, existed; but the "secret of hydraulicity" cannot be said yet to be known; it is still a vexed question of chemical theory. For some time after Smeaton's discovery it was supposed that a ferruginous character in a part of the ingredients was an inseparable, if not the principal condition; he himself seems to have entertained this idea, upon grounds that seem both insufficient and even contradicted by some of his own experiments. It is curious that Smeaton seems to have reached the result which eventually satisfied him through what may be partly called an accident. He had been led to think that he would find *Terra Puzzolana* from Civita Vecchia a better material for mixing with the Aberthaw lime than *tarras*, which he had previously tried; and "fortunately he found at Plymouth a considerable quantity of this material, which a merchant had imported on speculation, expecting to sell it to the contractors of old Westminster Bridge. But neither commissioners, engineers, nor contractors would trouble themselves even to buy it, so the venture turned out a bad one for the importing merchant, but a lucky thing for Smeaton." The test-balls made with this proved so satisfactory in their behaviour that he expressed his conviction that by this means he could make a cement which would equal "the best Portland stone" in solidity and durability; and from his comparison with the stone the new material came to be called "Portland cement"; an accidental name having no connexion with Portland in any way, as has been often supposed. Mr. Reid is, in fact, bent on showing in his book how widespread in regard to locality the materials for making this class of cement really are. As he observes, the fact of its invention and improvement in English hands has led to a general impression of the local nature of the manufacture, and that, in fact, "English Portland cement" is an article of universal currency. "The port of London, attracting the commerce of the world to its docks and river, naturally assisted in the establishment of a belief that Portland cement was indigenous to its neighbourhood, and could only be produced by a combination of the chalks and clays found on the banks and shores of the river Thames and its affluent, the Medway. In France and Germany, however, large works have been for a long time in existence, and it may be said that London, Boulogne, and Stettin, respectively, represent the chief centres of this industry in these three countries." And a long chapter of Mr. Reid's book is devoted to "geological and mineralogical observations" intended to throw light on the position and geological distribution of materials suitable for the manufacture of Portland cement,—a chapter which contains a great deal of very useful and suggestive information, though some portions of it are hardly to the point.

The general progress of experiment since Smeaton's time, however, has really had for its object to do with English materials, that is, with materials found at hand and near to each other, that which Smeaton did with a mixture of English and foreign material, the latter having been fortuitously brought within his reach on moderate terms on that occasion, but not presenting in general the means of economical manufacture. The name of Sir C. Pasley fills the largest place in the list of investigators, and it was he who pitched upon the alluvial clay of the Medway as the best material for the purpose. The degree of heat to which the cement was to be burned in the kiln was, however, a point in regard to which there was long misapprehension, the majority of the experimenters being afraid of the application of heat to the extent which has subsequently been found to be beneficial. Edgar Dobbs, the wording of whose patent (taken out in 1810) shows a very detailed knowledge of the *rationale* of the process to which he was subjecting the materials, nevertheless remarks that the intensity and duration of the burning must be such as "to expel the carbonic acid from the lime without vitrifying any of the substances"; and all experiments up to about 1820 were carried on upon this supposition; "instead of driving the mixture to the point of vitrifaction, all the operations were so conducted as to studiously avoid such a result; and when by accident this occurred, the pieces so hardened were carefully rejected as worthless." Mr. Reid attributes to Aspdin, of Leeds, whose patent was taken in 1824, the discovery of the advantageous effect of a high temperature in the kiln in bringing the ingredients into closer union, producing that high specific weight which is considered by many to be one of the tests of a good Portland cement. Aspdin's own specification for his patent, however, which is quoted *verbatim*, does not include any direct remark as to carrying the heat to the point of vitrifaction.* Indeed, we must say that the whole chapter on the historical development of the cement, though containing a great deal of information, is put together in a very confused and confusing way, no definite chronological order being observed; and in some cases the observations seem quite contradictory, as in a paragraph on page 28, in which reference is first made to the "salient property" of quick-setting in Portland cement, while in the very next sentence "a protracted setting" is given as one of the tests of the best cement. It may be observed, before quitting the historical part of the subject, that in spite of all the attention bestowed upon Portland cement by scientific investigators, and the high estimation in which it is now held, the material was a long while in making its way into favour, and was at one time nearly "extinguished" by Roman cement. The author attributes its final success in the market to the impetus given to its use in connexion with the London drainage works in 1859.

The chapter before mentioned, on the geological and mineralogical aspect of the subject, is perhaps the most useful part of Mr. Reid's book, as it includes a great deal of information in regard to the localities in which materials may be looked for, and a number of detailed chemical analyses of various ingredients that either have been used or might be used in producing a Portland cement; and as the economical employment of materials, in regard to proximity to each other and to the place of manufacture, is one of the most important conditions for manufacturers and the public, the information here formulated deserves the attention of those most directly concerned; whom, however, we must refer to Mr. Reid's pages for the further consideration of the subject, as the chapter is distinctly statistical and nothing more. We may, however, refer to the short chapter following this one, which suggests some *artificial* materials for making Portland cement; a suggestion which is of special importance, as it seems to offer the means of utilising some of the waste products of manufactories, which are now much worse than useless, and are allowed to cumber and disfigure the land in the neighbourhood of the manufactories which produce them. Among the materials the utilisation of which is thus suggested is iron slag, which has long been suffered to disfigure with its dreary-looking heaps whole square miles of country in certain districts. This, however, as the author notices, has already been utilised in some places as railway ballast, instead of being left in useless heaps. From the analysis of some of these slags it would appear, on the face of it at least, that they are peculiarly adapted, in regard to chemical composition, for cement-making, as they contain not only silica and alumina, but also a considerable item towards the amount of lime necessary to combine with the silica in the proper proportion for cement, so that some of the lime also would be furnished by their use, provided (which is the point we should ourselves feel just a question about) they can be successfully combined and amalgamated with the rest of the material necessary. Waste from lime-burning, which is in fact (from the analysis of an average sample) hydrate of lime, with a usually small proportion of sand, silica, and other ingredients, is a material which has been used lately for cement-making, and the author notes that in the Buxton districts waste of this kind exists, ranging in quality from that newly deposited from the kilns in a free or caustic state, to that which is probably a century old, and almost as hard as the stone from which it was originally obtained; and that barn and cottage floors, of a most durable description, are frequently made of this waste. "These waste heaps are commonly in close proximity to the other ingredients, in the form of shales and clays. At present their cost is merely nominal; and even supposing this increase to cease, there is abundance in many districts to supply the cement-maker during this century at least. That good Portland cement is being made from this source establishes its value in that direction; but, like every other supply of the carbonate or hydrate of lime, it must be converted in the locality in which it lies, as no expensive carriage for these materials can be tolerated." Another material which has been thought of in this relation is alkali waste, in regard to which the author remarks that he was consulted some years ago by one of the largest manufacturing firms in the St. Helen's (Lancashire) district in regard to the possibility of turning their waste to account in Portland cement-making; but the large amount of sulphur in it, forming sulphate of lime, prevented its applicability for a hydraulic cement. Mr. Reid adds, however, that since that date a desulphurising process has been employed for the recovery of the sulphur, and that the remaining material, after this process, would have a much better chance of proving a good cement material. Those who know the district referred to would think any process much to be desired which would facilitate the economical

* The Science and Art of the Manufacture of Portland Cement, with Observations on some of its Constructive Applications. By Henry Reid, C.E. London and New York: E. & F. N. Spon. 1877.

* As Mr. Reid attaches great importance to what is called "heavily-burnt" cement, and reiterates his view on this point repeatedly, we may just remind the reader that some eminent practical authorities are not so decisive in regard to the advantage of vitrifaction. Mr. Grant, C.E., in the course of his papers on the "Strength of Cement" (read before the Institution of Civil Engineers) points out that the slow-setting of this heavily-burnt mixture renders it unsuitable for some positions (as in moving water), where a lighter cement would set more quickly. He added that "another inconvenience, to which this heavily-burnt cement exposed the engineer, was the almost certainty that it would not be properly ground. Theoretically the cement should be an impalpable powder, and every grain of sand a matrix round which the cement should form a film or coating; but this could scarcely be the case with a material which it was so difficult to reduce to power, as the heavy cement in question. On the contrary, if carefully scrutinised, by passing it through a sieve or by washing it, a considerable residue of particles resembling sand would be found, comparatively inert in their character, with very feeble setting properties, and of a nature to diminish the amount of real sand which the cement would otherwise carry. He might also add that the coarsest ground cement being found to weigh the heaviest, the exaction of a very heavy specific weight, unaccompanied by any other restriction, offered an inducement to imperfect pulverisation." What does Mr. Reid say to this?

removal of the peculiarly obnoxious form of waste material, emitting fetid odours, which renders the land about these manufactories hideous to more than one sense. We have emphasised a little this chapter on the utilisation of artificial material, considering that any means of turning such manufacturing waste to account, instead of letting it "cumber the ground," is of great importance, and in fact a subject which ought not be let alone until the right use is found for all such "waste," which is only "matter in the wrong place." Nature "wastes" nothing; and it is our business to learn and adopt her grand economical method.

The short chapters on the choice of a site for cement manufacture and on the selection of the raw materials are very practical and to the point; but the latter chapter furnishes an important instance of the author's want of method and the inconsistency of statement in different portions of the book. In the introductory chapter of the work it is remarked in reference to Aspdin's specification (p. 15) that he employed what is now called the "*double-kilned* treatment," but that the processis *now abandoned*, because "*modern machinery effects as perfect a reduction of the hardest materials* as is necessary for their perfect amalgamation with the silica and alumina ingredients." The reader is left to infer from this that the object of this treatment, in which the lime is calcined twice, before mixing as well as after mixing, was to facilitate the union of the various ingredients; but he gets no definite statement as to the philosophy of it till he comes to page 144, when for the first time he gets the reason of the process set out, but in a manner that entirely contradicts what has been said in the last quotation, *e.g.*:—

"In the handling of amorphous materials it is only a question of simple mechanical operation to reduce the varying indurated chalks, clays, and shales, so as to fit them to perform their required task of free and accurate mixture. In dealing with hard crystallised rocks, the task is much more onerous; for, however finely you may reduce the material, you cannot reduce the crystal; no matter how small the atom, it is still a crystal, and *your utmost sources of mechanical reduction fail* to effect its complete extinguishment. The mechanical expense of this operation is therefore considerable, and, however accurately performed, it may never succeed in the realisation of a powder fine enough or sufficiently soft to ensure the perfect chemical combination of the various materials. To accomplish what must be regarded as the most important part of cement-making operations, it is desirable, to ensure the success of this initiatory stage of manufacture, *to first convert the limestone into lime by the ordinary process of burning*. That alternative thoroughly overcomes the objection to the crystalline character of the mechanically reduced stone."

We quote the above passage because it is an interesting and, in itself, perfectly clear statement of one of the mechanical difficulties in the preparation of the material, and of the reasons for the double calcination. But, on the other hand, if we compare the passages which we have printed in italics in this and the previous quotation, it is impossible not to see that the author is absolutely contradicting himself.

In the course of remarks upon the treatment of the materials in manufacture, we find again a strange want of consistency in the author's opinions as expressed in different parts of the book. In the general chapter on "Treatment of the Raw Materials," he sums up the methods under three heads, viz.:—"Wet" method, "semi-wet" method, and "dry" method. The object of all the processes is the accurate and complete mixing of the two elements, the lime and the clay or silicate. In the wet method, which was the earliest, and is still, we believe, the most commonly used, the lime and clay are mixed through the agency of a wash-mill, in about four times their own volume of water, placed in a circular vat, and churned, as we may say, by a horizontally-revolving frame, with vertical blades immersed in the water. The semi-wet method was patented by Dupont, and introduced subsequently into England as "Goreham's Patent Process," and consists in passing the "chalk"* and clay through horizontal mills while in a semi-plastic state. The dry method is the reduction and mixing of the materials by grinding machinery while in a dry state. None of them seem to be regarded by Mr. Reid as entirely satisfactory, and it is impossible to find out which he recommends. The (obvious) drawback to the wet method is the difficulty arising from the different specific weight of the two classes of materials, which renders them, even if completely mixed under the action of the continually-revolving blades of the wash-mill, liable to irregular deposition in the troughs or "backs" into which the water is run off for the mixture to settle previously to draining the mixing water away from it. The mechanical or dry method requires considerable care to ensure thorough mixing, though it is obvious that it is free from any such palpable and essential danger as that of the wet method. The intermediate method Mr. Reid seems unable to make up his mind about. He says (p. 159) that "under the best conditions it must fall short, in thorough mixing value, of the wet process." This seems improbable on the face of it: and on turning to page 210 (the chapter on "the wash-mill") we read that the evils inherent in the wash-mill process are "practically unavoidable, and a tendency is now being shown to reduce this wasteful and dangerous process by adopting the Goreham plan of converting the stuff . . . . ; and we cannot do better than refer shortly to it"; the latter process being the very one which he had previously described as necessarily inferior to the wash-mill method. After this we can hardly take Mr. Reid as a guide in regard to this part of the subject; all we can really gather from his remarks might be expressed in a Hibernian formula,—"One plan is as bad as another—'faith, and a great deal worse!"

The chapter on mechanical means of crushing or reduction is well illustrated by diagrams of the various machines which are and have been in use, the principal of which are modelled on or are modifications of "Blake's Stone-breaker." In nearly all the principle of application of the crushing force is essentially the same; the crusher is formed by a fixed and a movable jaw placed vertically at an acute angle, so as to leave only a small opening between them at the lower edges; the stones are put in at the top and broken by degrees by a rapid succession of crushes imparted by eccentric movement from a fly-wheel, and descend as they are broken smaller, till they finally fall out through the lower orifice. In a machine which goes through such a continual succession of jarring shocks, simplicity and strength of parts, and the greatest possible distribution of the shock through all the parts, are necessary elements; and the methods by which these ends are attained in some of the machines are very ingenious, but they appear to us almost all to be chargeable with one common defect of principle in the method of attack of the crushing jaw, which works on a centre or hinge at the *upper* angle of the jaw, which consequently is practically fixed, and the greatest movement takes place at the lower edge, just where the stones have got smallest and require the least force to reduce them, and the method of action increases the angle between the two jaws at the moment of the blow, whereas the nearer parallel they are (as in a vice) the more directly would the crushing force be excited. This drawback is remedied in the improved form of "Goodman's crusher," shown in figure 15 (page 204), where the movable jaw works on its lower edge; it seems strange that a matter so obvious should have required so many stages of invention to arrive at it. The most effective action would be that in which the two jaws approached each other with a direct horizontal action, but the economical application of the power in this way might not be so easy. Another form of Goodman's crusher or triturator, shown on p. 199, has a pair of toothed jaws working against each other with a combined clipping and grinding action (the latter obtained by a slight rotatory movement) which is about as precise an imitation as possible of the grinding action of the jaws in living beings. It was first designed for reducing metalliferous quartz rocks with the view of extracting their ores, and is only applicable to the reduction of comparatively small stones, not being fitted for the rough work of the other crushers. These machines are not, as may be supposed, connected solely with cement manufacture; they are largely employed in the preparation of road-metal.

The chapter upon the theory and practice of the construction of kilns is very interesting. The three objects of kiln-burning Mr. Reid defines as, 1st, the expulsion of the water remaining in the material from the mixing process; 2nd, the expulsion of the carbonic acid gas contained in the carbonate of lime proportion of the mixture; 3rd, and (as he says) most important, the combination, by fusing and clinkering, of the lime with the silica; these stages of operation being successive in the order named. In the ordinary dome-kiln the materials are arranged by placing on the bars, when the kiln is cool, a layer of wood for ignition, succeeded by alternate layers of coal or coke and of the materials to be burned. The first heat, before the coke is fairly ignited, drives off the water; and the second stage is completed when all the carbonic acid is evolved, which requires the temperature of a light red heat. "The quantity of carbonic acid thus requiring expulsion is something enormous, so much so that for every ten tons of Raw Portland cement, four tons at least of this acid are set free. So that when you estimate the weight of coke, or other fuel, and raw material, put into a dome, or any other kind of kiln, and compare it with the cement produced, you can form a fair idea of the amount of power absorbed in its handling." After the evolution of the gas, the heat rises still higher, and the operation of fusing begins. According to Mr. Reid, the arrangement of the fuel and material so as to equalise the heat over the whole mass, and the determination of the point at which the clinkering has proceeded far enough, are alike matters for a "rule-of-thumb" judgment on the part of the workman, who simply goes by his experience in previous cases. The waste of fuel is very great from the necessity of warming the cold kiln, and from the amount of heat carried away by the carbonic acid; not to speak of the speedy destruction of the kiln through the contracting and expanding of the brickwork during intervals of heat and cold. In contrast with this is Hoffmann's "ring kiln," in use in Germany, where the furnaces are arranged in a circle and connected to a central chimney by flues from the bottom of each furnace, so that all the gases before escape have to contribute their full quota of heat to the general result. "Each chamber is so constructed that it can be readily put into communication with the outside air, with the central flue, and with the adjoining chambers; the first, to obtain the necessary air for combustion, the second for the purposes of draught, and the last to receive the waste heat from one chamber, and in due course, and as the combustion proceeds, pass it on to the next. The fuel is introduced at the top." Of the superior science and economy of such a furnace there cannot be a question; but, as Mr. Reid half admits, its manipulation so as to gain all its advantages requires an amount of thought and attention which it would be difficult to get, for some time to come, from English workmen enamoured of their former (want of) method; and part of its superiority, economically, depends upon its constant employment. Each separate furnace has to cool in order that the charge may be drawn, as in the ordinary kiln; but in the case of the Hoffmann kiln the greater part of the waste heat goes to the adjoining furnaces which are supposed to be in action, and which also keep the walls partially heated, so as to avoid the extreme effects of contraction while a furnace is not in use.

We have only space here to refer to the lengthened chapter on the important subject of testing-machinery, which also is fully illustrated, and to the descriptive and suggestive chapter on the uses of Portland cement: just observing (as it is connected with a question much agitated just now) that one special suggestion is the use of concrete to form large rain-water reservoirs,—"a series of covered concrete reservoirs communicating with each other by the aid of pipes or tubes of the same material, and judiciously contoured on the catch-water principle, would change the face of this country, besides affording relief to fever-striken homes by a plentiful supply of water in their time of need. That the rainfall is more than ample for all moderate, and even extravagant, wants, is beyond doubt, and its perfect utilisation should no longer be delayed." That the idea is well worth carrying out to a certain extent, and that there is an enormous waste of rain-water, there is no doubt; but Mr. Reid seems to forget that it is part of this very water which is drawn up again from the earth eventually by mechanical means and under different chemical conditions. The question would seem to be whether it were truer economy, in the widest sense, to construct reservoirs to catch moisture as it falls from the clouds, or machinery to draw it upward out of the earth. The working cost of the former would be less, of course, and no doubt a great deal might be saved which is now lost, and a large margin of storage ensured, by an extended system of rain reservoirs.

The past and future importance of the subject, and the elaborate character of the book, justify our devoting some considerable space to it: at the same time we must say that Mr. Reid's work exhibits in a high degree the defect so common in books of this class in England, of want of

* The author himself uses the word chalk, here and elsewhere, apparently as synonymous with lime or carbonate of lime, though, of course, chalk is in reality only one of the forms in which the lime is found. This carelessness of wording in a scientific treatise is much to be deprecated.

method and arrangement and of a clear literary style. A man who undertakes to write a large practical treatise of this kind should not only have a detailed knowledge of the subject himself, but should know how best to convey his knowledge to others. Any one who compared this book with such a treatise as Coignet on Béton, for instance, would be struck with the difference; in the work of the French engineer everything is as clear, precise, and logical in statement and arrangement as a proposition of Euclid; in that of the English engineer we hardly know where to look for anything; a remark which ought to be at the beginning of a chapter, to explain the drift of what follows, occurs at the end; and so on. If Mr. Reid had been more logical in his arrangement and style, he might have conveyed the same information much more intelligibly in a book of little more than half the size of this, and of course at proportionally less cost. His use of language is often absurd; as when the mention of a proposal to dry lime by pressure prompts the remark that "it is singular how perverse the human mind is, and often revels in retrogressive action" (whatever that process may be); when we read that Mary Anning, the geologist, "is the ichthyosaurus now in the British Museum" (p. 35); not to mention almost numberless slips in grammar and construction. The most curious mistake is that in the last sentence of the preface, where the writer states his conviction that his book will certainly be regarded as perfect, though his obvious and more modest intention was to say the reverse.* We do think that those among us who undertake to communicate practical knowledge to the world should first learn the right use of their medium of communication, the English language. They would save themselves and their readers much trouble in the end.

"EVOLUTION" IN ARCHITECTURE.

THE subject of styles is certainly just now a much vexed question,—a *vexata quæstio* in the usual formula; but as discussions proceed, it is not certain that a "vexing question" may not become the more appropriate phrase. It is not, however, on this account that its consideration either should or can be shirked; in every difficult inquiry we must be prepared for a crisis of wearisomeness, and whether it comes on as a hot fit or a cold, to give way to it is to renounce the fruit, the ripening fruit, of all past labour. All cessation is premature until something like a settlement is attained to, and there comes in sight at least such a modified conclusion as the world in such cases has to be contented with. He must be a sanguine man indeed who can entertain a hope that any controversy whatever will come to an end by absolute conversion of all parties to it to an identical opinion. No such euthanasia is in store for any debate which has once raged with a certain degree of vivacity; a lull sometimes ensues from one or both sides getting tired,—from one or other side finding silence the pleasantest way of dropping some arguments that have become too palpably indefensible; and sometimes both antagonists cease to care about a matter which once set them furiously at odds; though by no means admitting to each other or even to themselves what perhaps they might if candour and a clean breast were in question,—that it had been misapprehended by both, or that both had found out that they had been all along fundamentally of one opinion, and only blundering about words. Perhaps this last unavowed but still effective conclusion is the most frequent, and perhaps it is the happiest of all. Nothing will conduce so favourably to bringing it about as a reduction of the terms that recur most frequently to a precise definition: the attachment to them of limiting explanations, after which even perverse ingenuity may be at a loss to use the same phrase again for different things.

Socrates would have commenced a conversation on our topic by inquiring, What do you mean precisely by a style?—and his respondents would be at least reported to us,—whether the dialogue reached us through Plato or Xenophon, as instancing one style after another,—say the Egyptian, the Doric, the Ionic, and so forth. Then they would be checked by the inexorable interrogator, and ultimately brought to admit that to produce a chair or a table is not to explain what is the meaning of furniture, that armour does not mean a helmet, or clothing a shoe, nor does an example of a style define style in itself,—the idea of style. We may think that the interrogated sometimes do not have fair play in the reported or rather the invented dialogues, and are exhibited as more dull than they were likely to be on a matter so simple. But simple as it seems and obvious to take for granted to begin with, that we know what we are talking about when we begin to talk, in nine cases out of ten where there is disagreement, it proves that a definition is not what we can start with, but what we have to work our way to; it is the satisfactory end, if indeed to an end so satisfactory we can arrive, and not the beginning of our inquiry. Hence if the perplexing old Athenian could re-appear among us and challenge us to state distinctly what we mean by an architectural style, it might be as well to turn the matter over a little before exposing ourselves to his retort.

The chief characteristics of a style, shall we say, are a certain harmonious coherence and final self-contained completeness; we certainly are not disposed to call a mere huddle of clumsiness and inconvenience and disorder in buildings an example containing the marks of a style, however vast or however prevalent may be such an unfortunate attempt at construction. Such may be the way in which a particular tribe may have been content to house itself for centuries, but to what we have beating in our mind more or less distinctly as an idea of style, it assuredly does not answer.

Let us betake ourselves to another Socratic expedient, and try what help we may obtain by an analogy,—the more familiar the better,—his own favourite way of getting philosophy clear out of a mist. We have no difficulty in recognising that Style in art is much the same as Breed in organised nature. We talk, indeed, of the contingencies of style in metaphors borrowed from breed. We have pure and degenerate, spurious and mongrel styles, very much as we talk of our dogs as of pure race, mixed breed, low breed, or mongrel. And there is something more in our resort to these metaphors than a mere random escape from a difficulty of expression. What else is the ultimate characteristic of high breed in an animal or a flower, if not the same as that of a style of architecture? When we speak of either in terms of the highest generality, we apprehend a thoroughly balanced combination of powers and proportions with reference to ends or purposes of a certain grade of complexity, and beauty, and elevation. The thoroughbred horse or greyhound exemplifies the perfection of style in nature, and it is scarcely forced to say that we witness the equivalent of high breed in a Greek temple or a Gothic cathedral. Indeed, the gradual development of a style, its divergences into varieties, advance towards perfection, its degeneracy or decline, or supersession by another,—all these contingencies exhibit it in curiously close relation with the incidents of a breed or a species under the influences of primary growth and casual or methodical culture. Very much, then, of what goes by the name of evolution, has its place in the philosophy of art no less than of nature; and it may be that while some hints may be derived from the theories of the physical evolutionists, the obligation may be more than repaid by a study of the principle from the side of art.

If we were to accept all that is very confidently told us, which fortunately we are not bound to do, we should believe that "all organisms are derived from one or a few originals by process of evolution, and that hence all species are related." But we have only to translate this into our own vernacular of architecture to find that we must demur at once. Styles may be all related, and doubtless are, but that is due to the essential characteristic of all of them having relation to the common necessities and common feelings of man. We are as little bound to one original as to a few; if one style may originate independently, why not another?—and if a few, why not a multitude? In the intellectual as in the material world, we see around us—

> "All nature quick and bursting into life";

the fact of affinity between styles or their mutual interaction and modification very manifestly does not prove a single source and local origin; and as little, if the evolutionists will allow us to say so, does the fertility of unions of varieties imply of necessity a single direct line of descent. Notoriously a dog knows a dog, whatever their exaggerated contrasts; but against those who hold,—and there are such, of not mean reputation,—that Italian greyhounds, bulldogs, and mastiffs, to name no more, had originals as distinct from each other, as the primæval ancestry of eels and hedgehogs, the rigid evolutionist has nothing to reply at last but that for his part he does not think so, and that if we grant all that he chooses to assume there is no necessity that we should think so.

The factors of evolution which the physicists chiefly insist on, are Heredity, which they define as a tendency to the continued transmission of peculiarities; and then adaptability to Environment, involving a tendency to variation under the influence of the total of surrounding physical conditions.

Habit, tradition, imitation, are the forms under which Heredity declares itself in styles of architecture, with consequences familiar enough. One generation builds, on the whole, just as it speaks and dresses, very much as its fathers did; the sequence is continuous. And this is the case with faults which check or reverse the best development, as well as with excellencies; much is reproduced very happily after its reason is lost, but much also of which the reason exists no longer, and much that never had a justifying reason. To the architect it may be often said as truly as to a sufferer by the gout or by a Chancery-suit,—"Woe unto thee that thou art a grandson!" The accidental or the imposed misarrangements of one continue to be repeated by ages that follow, even as a rabbit born with one ear has transmitted the deformity, and mutilated guinea pigs have perpetuated an inheritance of toelessness.

What the philosophers call *atavism* may in strictness be regarded as heredity in its strictest form; it is the liability of a breed or a variety to revert to the original and simpler type; acquired peculiarities occasionally die out, even suddenly, and leave apparent the original features of the unmodified stock; so it is that the gardener sometimes finds heartsease, perfectly wild in both flower and foliage, springing up from the unmixed seeds of the most finely cultivated. Among pigeons this has been found to be the consequence of crossing very strongly-contrasted breeds, and attempts to secure transmission of an excessive variety of characteristics. We have not far to look for a comparison to this in architecture; not the longest architectural life is required to recal more than one reaction to a plainer and cruder style, which has ensued upon temporary or persistent prevalence of a straining after novelty by overcharged elaboration, or upon either desperate or ignorant attempts to blend the repugnant and the incongruous.

The chief influences which are assigned to Environment are usually classed as those which are due to crossing of breeds or varieties, and then to changes in general external conditions, as of climate, food, exercise, or confinement, and so forth.

The response of architectural variations to climatic,—to follow forth the analogy,—scarcely needs specific illustration; it is difference of climate and not of occupant that produces the contrast between an English country-house and an Indian bungalow,—between the flat-roofed Egyptian temple and the pedimented Parthenon; and if nothing pushes on development of an organism like abundant and even excessive food, at the period of growth, it is no less the case that accumulative capital is the great stimulant of building, that the works of the architect must be rooted in supply of resources, even to lavishness, for some of the grandest conditions of effect; while duly-proportioned if scantier means are indispensable for the attainment of an important effect, even in a style of more austerity. Severity itself cannot be characteristically embodied in stone and marble without expenditure that draws deeply on the oil of the lamp of sacrifice. If development may be corrupted when pampered to excess, it perishes outright under the frugal regimen that means starvation.

The most popular expositors of the mysteries of evolution and breeds are sometimes given to allow, at least tacitly, too liberal a scope for the fortuitous on the one hand, and the arbitrary on the other. The determination of a genuinely self-consistent and characteristic type is implicitly conceded to influences merely accidental, or to arrangements of influences that aim at an arbitrary result,—any one out of a number that might be adopted as reasonably. But a noble development depends on the concurrence of special external influences that have a pre-existent sympathy with specific original capa-

* For Mr. Reid's information, if he strikes out the word "but" in the sentence referred to, it will mean what he intended it to mean.

bilities,—on the rich capacities and tendencies of the primal germ being fostered by those surroundings which alone are suitable to promote its advance to a determinate form and projection for it. Sometimes these conditions may seem to fall together fortuitously; some of the finest French pears, it is said, and one English apple at least, have been come upon in full perfection growing wild; and some buildings, it may be, have been hit upon by uncultured nations and early times, which exhibit types of graceful design and beautiful proportions. But otherwise perfection depends on the original endowment being studiously and advisedly put in the way of those circumstances by the aid of which, indispensably and exclusively, it can truly declare its qualifications and flourish. A certain wild flower has a capacity for one most beautiful development,—a special tendency to realise a particular type, which, if we regarded the flower as conscious, might be called its dominant ideal, the purpose that it ever longs and endeavours to accomplish. But any such tendency is in sympathy with and relative to external circumstances that may seem entirely independent of it,—to *pabulum* and protection, and regulated warmth, that it cannot itself control or go in search for. Nature, however, in one kingdom hearkens to nature in another; the link of relation is as absolute here as between the orchid and the insect, on the agency of which depends its chance of fertilisation. When we contemplate this correlation permeating and harmonising secondary divisions of nature, we cannot but ask ourselves,—where does it stop, and what right have we to assume that stop it does. Is it certain that it was accident and not some deeper cosmical sympathy that settled the Greek race precisely where the Isle of Paros and the Pentelic range were at hand to supply the very material that was needed for development of plastic art by the finest geniuses for sculpture the world has produced?

However this may be, we may rest assured that in every combination that presents the rudiments of a style of art, there is contained the germ of an ideal which it is for trial and for study to attain to as a definite conception, which has to be sought for and found, and recognised at last by a natural harmony,—"Congrueing in a full and natural close, like music."

The endless combinations and trials in thought, on paper and even executed, of a thorough student, his comparisons of imagined forms, his repeated testings of compatibles, in working up to such a result, are comparable, without derogation, to the mingled theoretical and practical operations of the man whose object is to perfect a breed of animals, or a fine flower; and, having obtained it, to fix and continue it. Judicious crossing,—sedulous culture,—aims at eliminating wrong conditions, and approximating the desirable; it is a process in which skill does not seek to counterwork nature; but to divine, to interpret, and be a fellow-worker, with capabilities and purposes which, it is an antecedent and just conviction, are certainly there to be divined, and to reward the industry and sagacity of the interpreter. Crossing is the art of methodical combination, and is most successful when the sagacity in discriminating and estimating differences has been cultivated till it seems an instinct. So have been produced those marvellous specimens of high culture and pure breed that attract multitudes to shows and competitions. To this art we owe the English racer, and many another champion, which, while equally a horse, has perfections so distinct and so peculiarly characteristic, as to declare him equally the standard type of a breed.

With such contrasted but equally perfect types it is not below the dignity of the orders of architecture to be compared; but here, in truth, although we generalise orders, it is the fact that every example of each order, when of a fine period, is itself a special type. This has been notorious since the examination of the monuments themselves exposed the mistake of the confidence which was placed too long on the fixed Vitruvian formulæ. The finest art is in this respect in complete harmony with those phenomena to which we indulge ourselves in tracing their analogy. Even in the instances of the most established breeds, it is only relatively that they can be said to be fixed. "Nothing is at a like goodness still," says Shakspeare; and in the case of the arts, not only can no style go on persistently through the ages unchanged; but it will change from one master to another, nay, from one example by the same master to another. Fine art ceases to be when it ceases to change. We divide the history of art into periods for convenience; and have our general ascriptions of merit or degeneracy, which make no further distinctions; but when accuracy is in question, we find that every master of the finest time had a style of his own, and a style that even in his own hands was constantly in flux,—that was modified into what connoisseurs refer to as the succession of his "manners."

Some of the most important developments of the arts have ensued upon the confluence of two styles previously considerably remote. We are used to contemplating Gothic architecture as developing from within,—but these secondary developments might fairly be designated *manners*;—if we go back far enough, we find that the style ever took its great starts at periods when the movements of nations brought men acquainted with very contrasted forms. So the works of Dante, Raffaelle, Michelangelo, of Shakspeare and Milton, combine ever the characteristics of two forms of civilisation,—of the revival of learning and of all that went before,—combine them harmoniously, and in virtue of their harmony claim severally the honours of the purest style. The great masters of Italian architecture stand precisely in the same position.

There seems at first sight a contradiction in the production of a homogeneous style by the concurrence of contrasted impulses, and still more in the proposal to obtain a fine breed by assiduous crossing, and then finding that purity of breed, which is its homogeneousness, can only be conserved by avoidance of crossing and by steadily breeding, as it is called, "in and in."

But the contradiction is only apparent. When the advance to a fine type is in progress, every well-designed cross has a special purpose and tendency to strengthen a certain quality and discourage others that are objectionable, and there is a controlling and subordinating power in what has been called the "prepotency" of one stock above the others. In consequence, when a truly fine type has been obtained, it has within itself a natural coherency;—it is the harmonious concentration of qualities that mutually sustain, we had almost said understand, each other, and the object remains no longer to search for improvement or corrections, but to preserve it from debasement by incongruous mixture.

It is the debasement of a fine type by admission of incongruous elements that constitutes the essence of the mongrel, either in nature or art; the title, low as it is, is not conferred, is not thrown away, upon a paltry muddle of insignificance and disability.

But a fine type, however, from the very liability to change that has been specified, is subject to degeneracy; and then it may rest with a "violent cross" to give any chance of a recovery or rescue by a new development through however many changes. The Greek orders had wandered far from purity by the days of Diocletian, and the architecture of Spalatro does not retain an order with enough of purity for the anomalous combination of arch and entablature to call for such a term as mongrel. It marks a reopening of the whole question of style; it is the first "violent cross,"—which long changes through a series of years at last were destined to produce in the happily combined arrangements of Romanesque. The great court of the palace,—one instance, no doubt, out of multitudes,—is a hybrid of the hybrids; but it is a bold break with heredity, with tradition; and by degrees, and in better hands, became divested of all that was characteristic of a crude expedient,—shook off the anomalous and the superfluous, and allowed the emergence of a new pervading principle. A revival that means, and that attempts to be nothing more,—an artificial galvanisation of the naturally defunct,—reproduction pure and simple,—simple as truly as pure,—of parts and details each labelled with authorisation of a precedent, and all put together with no obligation incurred to an organic principle to assure coherence and sympathetic culmination; what is such a manifestation but reversion or atavism in its worst form, and degeneracy combined? If an ancient style is to be laid under contribution for distinctly modern requirements, we have a problem that assuredly need not be insoluble, but that will tax ingenuity, imagination,—nay, daring to the uttermost. The conflict of pointed arch and mullion and tracery with our contemporary sash may possibly be susceptible of happy accommodation; but meanwhile let us not be afflicted by the spectacle of their discord at the height. To assume a character worthily is one thing, and common mimicry is another. If modern architecture masquerades as ancient, let it pass muster better than Falstaff before Sir Hugh Evans,—"I like not when a 'oman has a great peard; I spy a great peard under her muffler"; let it, at least, emulate the fat knight's subsequent "admirable dexterity of wit," when "But that my admirable counterfeiting of an old woman delivered me, the knave constable had set me i' the stocks, i' the common stocks, for a witch."

Such architecture is not likely to be mistaken for the work of either witch or conjuror; and if such an example is to be found, it may be left to it to set forth better than a column of exposition, with what appropriateness "mongrel" may be applied to a debasement of style as well as to the offspring of a deerhound and a bulldog,—of a Skye terrier and a turnspit.

MR. CROSS ON ART.

It is one of the æsthetic amusements of the day to bring out now and then a gentleman eminent in the political world, set him upon a platform, and get him to talk about art. There seems to be a kind of special interest in seeing how a man will talk on a subject with which he is not supposed to be acquainted; or perhaps the fact is that in this country political eminence is considered the highest kind of eminence, and when a man has attained it there is a desire to hear what he has to say upon any and all subjects, and one of the duties incident to his success is to be ready to speak about anything on any occasion. We do not know whether it ever strikes people that political success can hardly have much to do, necessarily, with a man's power of judging and seeing rightly in regard to the very different class of subjects included under the name of art. We imagine, however, that most persons would think there was something rather odd if the proceeding were reversed, if persons eminent in art were persuaded on to the platform, simply on that account, to talk about politics, and we read in newspaper headings "Mr. Leighton on County Suffrage," or "Mr. Millais on the Game Laws."

As the custom referred to does prevail, however, there is a certain interest in noticing what proceeds from the lips of public men when called upon to speak words about art, and comparing their various views. In some sense these indeed are not "various," for there are certain considerations, on the refining influence of art, &c., which are pretty sure to be forthcoming, and to be expressed in very much the same kind of language, on all such occasions. Apart from this, we find one statesman emphasising the moral influence of art, another confining himself to the narrower subject of art workmanship and household taste. Mr. Cross's remarks at the Cannon-street Hotel last week, when he delivered the prizes to certain metropolitan drawing-classes, conducted by Mr. Busbridge, take their place very well amid addresses of the kind; for the speaker avoided everything that could be called "fine talking" on generalities, and he made one or two special points. One of these was in recognising the influence of bad design not only on those who purchased and preferred it, but on those who had to make it. He saw, he told his audience, in spite of a certain improvement of late years, "very vulgar displays" in many rich people's houses,—things which were costly and magnificent, but which had very little real art feeling, very little of the really beautiful in them. "When he saw these things himself he could not but feel regret, not only for those who reside in those mansions, but for the workmen who prepared the furniture, and whose taste must have been degraded in so doing." There is something really pathetic in this, and no doubt the workman who has to execute a bad design, whether he will or no, is a rightful object of sympathy, if he happen to know better; but we doubt whether in fact those who make tasteless furniture, for example, often feel it in this way. Perhaps their artistic consciences are seared by long familiarity with ugliness and inconsiderate or false design; at all events, we are disposed to think that workmen may be found, and not infrequently, who will put very careful and honest workmanship into a bad design, and pride themselves on their work too, and seem to feel no compunction in being the agents for producing it. Mr. Cross thought if we elevated the taste of the workman we should elevate the taste of his employers; very likely we should if we could do it; but our impression is that a high standard in such matters is more likely to

proceed downwards than upwards in the social scale. As a rule, what a superior workman sees the meaning of is solidity, finish, and honesty of workmanship; he will exhibit a most conscientious endeavour to realise these qualities even while working on something that is really tasteless and unworthy of the trouble he is applying to it. The doctrine is perhaps exemplified in a different grade of workmanship, in the manner in which certain firms, supposed to represent pure taste in decoration, take the artistic consciences of their customers into their own keeping, and will let them have nothing but what the decorator considers to be the right thing. "He must have what is good for him, not what he likes," was the remark of one of these apostles of domestic taste, when directing something quite different from what his "customer" had expressed a wish for. Another point in Mr. Cross's remarks is one seldom brought forward by lay speakers on art, simply because their deficient knowledge or deficient sympathies close their thoughts to it,—namely, the importance of figure study. No one, he observed, could draw the picture of a man or woman worth looking at unless he knew the structure of the human frame; "to draw a mass of cloth or muslin with a face over it was not enough." It is as well that this truism, as it is to many of us, should be repeated till it comes to be a truism to the public generally; how many of them realise precisely what means such study implies may be another question; but it is as well that they should be (if anything) still more clearly told, and made to understand that if they think there are objections, on the score of modern manners and feelings, to the study of the figure from life (and some do think so), it is a question between that, or having no drawing or painting at all worth the name. But our impression is, that people are beginning to understand this better than they once did, and that the time may come when the fact that artists study from the living model will not cause surprise, or be talked of as if it were something necessary, but improper. Mr. Cross's other little "point" was his application of the teaching of truth in art to dress, in regard to which he specially addressed the ladies. "Did he not frequently see, for instance, rows of buttons on boots, which were not placed there for use? Buttons were very good things when wanted, but whether on boots or dresses,—and he had seen rows of them on dresses,—why should they be used, if he might so say, when they were intended to be useless?" The criticism admits of much wider application, nor was it altogether fair to direct it against the ladies in particular. He might have instanced the man's hat which is neither in shape nor in size corresponding with the head that wears it; or, still worse, the scarfs made up in sham knots and bows, and with pins which have nothing really to do with holding them together. Some of these fashions have come to pass in a very natural way, after all; they are "survivals of types"; the row of buttons, when buttons were used, formed a sort of ornament to the boot, and when they came to be disused in some forms of boot, the manufacturer was unwilling to part with the neat row of buttons, or did not know what to substitute. Each such sham incident in dress is a little thing in itself; in some moods one might think it beneath notice; yet it is well that even these little defects and falsities should be avoided: they are trifles separately, but the sum of them goes to make up that habit of life which is indicative of innate "good taste," which we take to mean refinement combined with truthfulness. We may add, however, that the abuse of compo because it is compo, and of graining because it is a representation only, is easy work, but needs qualification, or it must lead the critic to erroneous and injurious sequents.

Hydrants in the City.—The question of obtaining increased means of extinguishing fires led to a discussion in the Court of Common Council on the 13th inst. In moving the adoption of the report of the Gas and Water Committee, Mr. J. L. Shuter quoted statistics as to the cost of placing hydrants in the public streets, 739 of which would cost 22,000*l.*, and adverted to a statement of Captain Shaw that one of the hydrants already erected was equal to an ordinary fire-engine. The amount required to complete the entire system was 10,476*l.*, and it is proposed that a hydrant shall be placed within forty-five yards of every house in the city. The report was adopted.

THE EXCAVATIONS AT OLYMPIA.

EXCAVATIONS at Olympia having been again commenced, for the season, by Dr. Treu, we are enabled to publish a few details respecting his work up to the 15th ult. The more immediate object of this winter's excavations is to complete the entablature groups of the temple of Zeus, and so far the works undertaken have been to the purpose. The group of the western entablature has been already enriched by six finds, valuable, on the one hand, from their extent and preservation, but also of importance because they permit of the statues formerly found being completed in a satisfactory manner. At the east front, the works have not been so successful, the yield consisting merely of small, though numerous, fragments of the entablature groups. Some objects, however, of value have been discovered in that locality. They are three valuable archaic bronzes and three Roman statues, two of them with inscriptions.

The first important find on the west front, made on the 19th October, was the centre part of one of the two colossal groups of Centaurs carrying off women, which stood next to the centre figure. The centre portion now found includes the breast of the Centaur and the third (middle) part of the female trunk, which, added to the parts already discovered, permits of the *motivo* of the group, of which only the head of the woman and a few extremities are wanting, being recognised.

Six days later, on the 25th October, the most important discovery was made: the gigantic trunk of the centre and principal figure of the western entablature. The head found last winter fits exactly on the neck of the present figure, and the latter is now complete with the exception of the right arm and lower parts of the legs. It is a colossal youthful figure, naked with the exception of a light chlamys round shoulder and neck. Its movement is moderate.

The third considerable find belonging to the western front is a Centaur's head, found on the 26th October. It completes the second of the large groups of Centaurs standing next to the centre figure of the western entablature, and described generally as the Deidameia.

The other three fragments discovered belonging to the west front are less important. They are a left thigh, a right foot, and a right hand of Lapithes.

Besides these finds, the exploration of the ground in front of the west face of the temple of Zeus has brought to light two of the most important bronzes hitherto found. They are a well-preserved head of bronze and a large bronze tablet of the shape of a trapeze, covered with reliefs in extremely archaic raised work, the style of the figures being that of the oldest so-called Corinthian vases.

The three Roman statues found are all without heads. The two female figures bear the inscriptions of Eros and Aulus Sextos Eraton, both Athenian sculptors, respectively. They are average reproductions of current types from the Athenian studios of the time of the Roman empire.

THE SITE FOR AN OBELISK.

YET another proposal for placing *the* obelisk, and a revived theory, on placing obelisks in general, appears in a letter by Mr. Waynman Dixon, addressed to the *Athenæum* last week, which for one reason in particular we notice. Mr. Dixon applies an old theory as to the setting up of monuments in general to the effectiveness of obelisks, which is that they ought not to be seen from a distance, being under such circumstances insignificant in apparent size; and that placing them in an open space, and in opposition to buildings in horizontal lines, therefore counts for nothing. The way we are to see them is to come suddenly upon them close to the base, and look up, and then we shall be impressed with their height and their size as monoliths, and not otherwise. The effect of foreshortening, the writer does not seem to take into account. On his principle, the site on which the model of the obelisk is now placed is objectionable, because it will be seen too far off along Victoria-street, and also because the railings of the flower-gardens of St. Stephen's-green interfere with the view of the base, and consequently with the effect of height. Therefore he proposes to move it nearer to the line of Great George-street, sacrificing the northernmost of the two greens, and making an open paved space in which the obelisk will stand. We notice Mr. Dixon's remarks for the one fact that the writer sees the absurdity of placing the monument over the railway tunnel. He says, "the very idea of such a monument standing upon the top of an arch is unsatisfactory. The Arabs say an arch never sleeps, or, in other words, is constantly exerting itself to thrust out its abutments, and sooner or later must succeed. Why, then, when we are erecting a monument which we trust will stand not only for hundreds of years, but which may indicate the site of where London once stood, when England shall have been submerged and rise again from the waves,—why place it on any structure which has a shadow of a doubt about it, when hard by we gain the advantages above enumerated, and have in the gravel beds below the surface all that can be desired for an enduring and sure foundation for ages to come?"

We owe some recognition to a writer who sees what a number of persons insist on shutting their eyes to, that there is a want of ordinary common-sense in the very notion of putting up a thing of this kind to stand over a hole in the ground, and on a foundation necessarily more perishable than itself. Accordingly, we thank Mr. Waynman Dixon, whose connexion with the engineer engaged on the work gives additional value to the expression, for this one piece of much-needed common-sense, and reprint his words as a small tittle of evidence to add to our own, previously delivered, on this practical point in regard to the placing of the obelisk.

THE LAW OF EASEMENTS.*

"AN easement," writes the learned author of "Gale on Easements," "may be defined to be a privilege, without profit, which the owner of one neighbouring tenement hath of another, existing in respect of their several tenements, by which the servient owner is obliged *to suffer or not to do* something on his own land for the advantage of the dominant owner." This definition was adopted by the Court of Exchequer in Mounsey *v.* Ismay. The term "servitude" is used to express both the right of the dominant and the obligation of the servient tenement; the term "easement" generally expresses the right only.

ESSENTIAL QUALITIES AND ACQUISITION OF EASEMENTS.

There must, as an essential quality of an easement, be two distinct tenements, the dominant, to which the right belongs, and the servient, upon which the obligation is imposed. The right conferred by an easement attaches upon the soil of the servient tenement. If any disturbance of an easement has taken place previously to the transfer of the servient heritage, although such tortious act would give a right of action against the former owner, his successor is also liable if he allows it to continue. The servitude, when once acquired, passes with the heritage into the hands of each successive owner. Although the right to an easement is a "privilege without profit," it has been held that an easement is an interest in land for the invasion of which compensation may be claimed under "The Lands Clauses Consolidation Act, 1845," 28 & 29 Vict., c. 18.

Easements are either affirmative or negative. Affirmative easements authorise the commission by one owner of acts which, in their very inception, are positively injurious to another; such, for example, as a right of way over, and a right to discharge water by a spout or projecting eaves upon, another man's land; the right to support from a neighbouring wall; the right to use or to affect water of a natural stream in any manner not justified by natural right. Negative easements are injurious consequentially, only restricting the owner of the soil in the exercise of his natural rights of property, as where he is prevented building on his own land to the obstruction of lights. The right of support of neighbouring soil for land *not encumbered by buildings*, and the right of a riparian owner to the flow of a stream in its natural course, are ordinary incidents of property, and not easements.

The origin of every easement may be referred to an agreement, either express or implied, of an owner of the property to be subjected to it. In case of express agreement, it will be obvious that the precise words of the instrument itself must determine the extent of the right created.

* From a paper read by Mr. Locock Webb, Q.C., before the Royal Institute of British Architects on Monday evening last. A report of the proceedings will follow.

Easements in general bear a strong resemblance to covenants running with the land, both express and implied. Thus, when the dominant tenement itself is conveyed, whether in fee or for any less estate, all rights which the conveying party enjoyed by virtue of and as appendant to his estate as against third parties pass with it.

EASEMENTS BY IMPLIED GRANTS.

The implication of the grant of an easement may arise in two ways,—firstly, upon the severance of a heritage by its owner into two or more parts; and, secondly, by prescription.

Upon the severance of a heritage, a grant will be implied of all those continuous and apparent easements which have been used by the owner, and which are necessary for the use of the tenement conveyed, though they had no legal existence as easements, and of all those easements without which the enjoyment of the severed portions could not be had at all. In the leading case of Palmer *v.* Fletcher, decided in the time of Elizabeth, the rule of law was laid down thus:—If A builds a house on part of his own land, and afterwards sells the house to B, and the land adjoining to C, who obstructs the lights, although the house be a new messuage, yet a person who claims the land by purchase from the builder cannot obstruct the lights any more than the builder himself, who could not derogate from his own grant, for the lights are a necessary and essential part of the house. Lord Chief Justice Tindal, in Swansborough *v.* Coventry, after referring to Palmer *v.* Fletcher, and other authorities, said,—"It is well established by decided cases, that where the same person possesses a house having the actual use and enjoyment of certain lights, and also possesses the adjoining land, and sells the house to another person, although the lights be new, he cannot, nor can any one who claims under him, build upon the adjoining land so as to obstruct or interrupt the enjoyment of those lights"; and in Riviere *v.* Bower, Lord Tenterden held that an action was maintainable against a possessor holding as tenant for the obstruction to a window existing in the landlord's house at the time of the demise, although of recent construction, and that although there was no stipulation at the time of the demise against the obstruction.

Grants will be construed most strongly against the grantor, for "no principle can be more sacred" (as was observed by the Master of the Rolls in Leech *v.* Schweder) "than that a man shall be compelled to perform his contract." And another kindred principle is, that "no man shall derogate from his own grant." Both these principles are well established rules of law.

Upon the severance of an estate, such rights of easements, usually called "*easements of necessity*," will be acquired by implied grant as may be necessary to give effect to the intention of the parties to the severance. For example, if I have a field enclosed by my own land on all sides, and I alien this close to another, he shall have a way to this close over my land as incident to the grant; for, otherwise, he cannot have any benefit by the grant. So also, on the same principle, if a man grants to another the minerals under his lands, the grantee would, as incident to the grant, have the right to execute the necessary works to win the minerals, including the right to fix machinery to drain the mine and raise the minerals. And if a man sells trees in his wood, that implies liberty to take and carry them away. The grant of a thing passes everything included therein, without which the thing granted could not be had.

But a grant arising out of the implication of necessity cannot be carried further than the necessity of the case requires. When, for example, a way is claimed by necessity, there must be a necessity continuing up to the time of the trespass justified under it, and it is a good answer to show that there is another way which the party may use. Again there must be a reasonable user of the easement.

EASEMENTS BY PRESCRIPTION.

Easements are also acquired by *prescription*,—or, in other words, by possession had during the time and in manner fixed by law; for after the lapse of the requisite period, the law adds the right of property to that which before was possessory only. To constitute a legal possession, there must be not only a corporeal detention, or that quasi-detention which, according to the nature of the right, is equivalent to it; but there must also be the intention to act as owner. An enjoyment in order to confer a title must have been uninterrupted, both as to the manner and during the time required by law; but in those easements which require the repeated acts of man for their enjoyment, as rights of way, it would appear to be sufficient if the user is of such a nature, and takes place at such intervals, as to afford an indication to the owner of the servient tenement that a right is claimed against him,—an indication that would not be afforded by a mere accidental or occasional exercise of it.

By the 2 & 3 Wm. IV. c. 71 (1832), commonly known as "The Prescription Act," the title by prescription is governed by statutory provisions, making length of possession prescribed by the statute a bar or title of itself, which was so before only by the intervention of a jury. The Act provides that (§ 1) claims to right of common and other rights with profit shall not be defeated after thirty years' uninterrupted enjoyment, unless held by consent or agreement; (§ 2), claims of rights of way or other easements the prescription should be twenty years; (§ 3), when the access and use of lights to and for any dwelling-house, workshop, or other building, shall have been actually enjoyed therewith for the full period of twenty years without interruption, the right thereto shall be deemed absolute and indefeasible, any local usage or custom to the contrary notwithstanding, unless it shall appear that the same was enjoyed by some consent or agreement, expressly made or given for that purpose by deed or writing"; and (§ 4), each of the before-mentioned periods should be deemed to be those next before some suit or action, wherein a claim to which such periods relate shall be brought into question.

A custom formerly prevailed in the city of London that a man might build to any height on his old foundations, although he obstructed his neighbours' ancient lights; and the like custom also existed, I believe, in the city of York and other places; but in the Salters' Company *v.* Jay, and Truscott *v.* The Merchant Taylors' Company, it was decided that such customs were abolished by the Prescription Act. One object of the Act was to shorten the time by which persons who had the access and use of light could acquire an absolute right to it. The third section does not, it will be observed, say "when the access and use of light shall have been enjoyed as of right," because every person has a right to so much light as can come to his window. The Act brought this to a simple question:—It says that after twenty years' enjoyment without interruption, the right shall be deemed absolute and indefeasible. In order that the enjoyment which, in the quasi-possession of an easement, may confer a right to it by length of time, it must have been open, peaceable, and "as of right."

PARTICULAR EASEMENTS.

Running Water is the subject of easements of several kinds. The right to receive a flow of water in a natural stream and transmit it into its accustomed course is an ordinary right of property,—a natural right. The right to interfere with the accustomed course, either by penning it back upon the land above or transmitting it, altered in quality or quantity to an extent not justified by natural right, is an easement. Without any convention, the occupier of a lower field holds it under servitude of recovering the natural drainage from an adjoining field on a natural level. This servitude is imposed by usage, depending upon natural situation, and extends to usual floods. But, if a storm floods the adjoining lands in an unusual manner, the land-owner may, it seems, fence against it, within the period of prescription. He may raise the banks to keep the stream within its ancient bed, if he can do so without injury to others, and so perhaps if the stream changes its course. "The right to the use of water," said Sir. J. Leach, in Wright *v.* Howard, "rests upon clear and settled principles: *primâ facie* the proprietor of each bank of a stream is the proprietor of half the land covered by the stream, but there is no property in the water. Every proprietor has an equal right to use the water which flows in the stream, and consequently no proprietor can have the right to use the water to the prejudice of any other proprietor." Easements of an affirmative nature, the object of which is to interfere with the natural course of the stream, may be acquired by user over a stream flowing through a man's own land, or through his neighbour's land. With regard to *eaves*, although every one in building is bound to construct his house so as not to overhang his neighbour's property, and to construct his roof in such a manner as not to throw the rain-water upon the neighbouring land, yet it would seem that a man may acquire a right by user to project his wall or eaves over the boundary line of his property, or discharge the rain running from the roof of his house upon the adjoining land.

As to Subterraneous Channels, the rule of law which governs the enjoyment of a stream in its natural course is not applicable to underground springs or subterraneous channels. In Chasemore *v.* Richards, which was decided by the House of Lords, the plaintiff was possessed of an ancient mill, about a mile from Croydon, which for upwards of sixty years had been worked by the flow of the river Wandle. The river was supplied with water produced by the rainfall on a very extensive district, large quantities of which sank into the upper ground to various depths, and then flowed and percolated through the strata towards and to the river. The Local Board, for the purpose of supplying Croydon with water, sank a large well, to a considerable depth, in their own ground, and pumped therefrom between 500,000 and 600,000 gallons of water daily, and by such means the ordinary underground percolation of water was diverted from the river to such an extent that the mill-owner lost the use of the stream, and sustained material damage; but it was held that this gave the mill-owner no right of action against the Board. It would therefore appear that any person may dig wells or cut drains in his own lands with impunity, although he thereby drains his neighbour's land, by interrupting the flow of water percolating through the pores of the soil, and which, but for such cutting or draining, would have reached his neighbour's land, or by causing the water already collected on his neighbour's soil to percolate away from and out of it. But on the other hand, if A makes a grant of land to B without any exception of the rights to the streams of water in the land, neither A nor any one claiming under him could, it is conceived, lawfully do anything which would have the effect of draining the underground water or diverting any stream from the land, for such an act would operate as a derogation from A's grant.

Sewers.—In a certain sense all sewers passing through the lands of private owners are easements; but sewers constructed under legislative authority, or which, although originally private property, have become vested in public bodies, such as the Commissioners of Sewers, are regulated by statutory authority. Commissioners of Sewers were originally established under the provisions of the 23 Hen. VIII., c. 5, commonly called the "Statute of Sewers," which was made perpetual by the 3rd and 4th Edw. VI., c. 8. By the "Land Drainage Act, 1861" (24 and 25 Vict., c. 133), the powers of Commissioners of Sewers extend (1) to cleansing, repairing, or otherwise maintaining in a due state of efficiency, any existing watercourse or outfall of water, or any existing wall or other defence against water, and to such other matters as are mentioned in the 16th section of the Act. By the interpretation clause "watercourse" includes all rivers, streams, drains, sewers, and passages through which water flows; (2) the deepening, widening, straightening, or otherwise. The law relating to *sewerage* is regulated by the Public Health Acts of the 31 and 32 Vict., c. 115 (the Sanitary Act, 1866), and the 38 and 39 Vict., c. 55 (the Public Health Act, 1875), which repealed the 31 and 32 Vict., c. 115, except so far as relates to the metropolis. Under the provisions of those statutes, all existing and future sewers, within the district of the local authority, except sewers made by any person for his own profit, or by any company for the profit of the shareholders, and sewers made and used for the purpose of draining, preserving, or improving land under any local or private Act of Parliament, or for the purpose of irrigating land and sewers under the authority of any Commissioners of Sewers, are vested in and placed under the control of the Local Authority, which is restricted from making or using any sewer, drain, or outfall for the purpose of conveying sewage or filthy water into any natural stream or watercourse, or into any canal, pond, or lake, until such sewage or filthy water is freed from all excrementitious or other foul or noxious matter, such as would affect or deteriorate the purity and quality of the water in such stream or watercourse, or in such pond or lake.

Nuisances.—The term "nuisance" is applied in the law indiscriminately, both to a disturbance of an easement already acquired, and infringements upon the natural rights of property, for which an action can be maintained. Strictly

speaking, however, the term nuisance should be confined to the latter class of injuries only; those acts which though originally tortious as infringing the common law rights of property, may nevertheless, in process of time, confer a prescriptive title by enjoyment. Many acts done upon a man's property which are in their nature injurious to the adjoining lands, and consequently actionable as nuisances, may be legalised by prescription. There can, however, be no prescription to make a common nuisance, which is a prejudice to all people, because it cannot have a lawful beginning by licence or otherwise, being against the common law. But when manufactories may have been borne with in a neighbourhood for many years, it will operate as a consent of the inhabitants to their being carried on, though the law might have considered them as nuisances had they objected to them in time. A manufacturer may consequently acquire a right to pour his polluted water into a stream as against all new-comers, so that those below him, coming after he has acquired the right, may not have the right to complain of what he does to the stream.

As to Light and Air. — The strict right of property entitles the owner to so much light and air only as fall perpendicularly on his land. He may build to the very extremity of his own land and no action can be maintained against him for disturbing his neighbour's privacy by opening windows which overlook the adjoining property, but it is competent for such neighbour to obstruct the windows so opened by building against them on his own land at any time during twenty years after their construction, and thus prevent the acquisition of the easement. The right to the reception of light and air in a lateral direction without obstruction is an easement.

The right to the enjoyment of *air* is generally speaking governed by the same principles as those which regulate the passage of light. The old authorities mention a singular case of an easement of this kind, from which it would appear that where one erected a house so high that the wind was stopped from the windmills in Finsbury Fields, it was adjudged that it should be broken down; but there were probably some special circumstances connected with that case,—the house may have been built contrary to some privilege conferred on the windmill, both the house and the windmill being on the estate of the prebend of Finsbury. Besides, at that time it was the practice of the Crown to prohibit and regulate buildings in the neighbourhood of London by proclamation, and the house may have been built in defiance of the proclamation, and the owner of the windmill may have sued for the injury he sustained by the building, which either was or was supposed to be illegal. There are several other cases in the old law books of complaints arising from injury by stoppage of windmills by buildings, showing that relief was granted on the ground that the buildings were *nuisances*, but all those decisions may probably be explained on some such ground as those relating to the Finsbury windmill.

It is rarely now that a case is established for the interference of the Court upon the ground of stoppage of air irrespective of obstruction to light, but in my own experience such cases have arisen. For example, in Kidd *v.* Wagner, heard before the Master of the Rolls, the complaint was that the defendant proposed to build a new church in Brighton, so close, and of such a height, as to stop the free passage of air to the plaintiff's malthouse, which required a free current of air; and in Dickey *v.* Pfeil, heard in the last vacation, before Mr. Justice Fry, where the complaint was mainly grounded on the stoppage of the free current of air to the plaintiff's houses situated in the crowded neighbourhood of Drury-lane. In both cases *interim* injunctions were granted, but such instances may be considered as exceptional, and in the following observations no distinction is intended to be drawn between the obstruction of light and air, although mention is made to the obstruction of light only.

With regard to the law relating to the obstruction of ancient lights, the old doctrine which was established by Lord Eldon, in what has been termed the parent case of The Attorney General *v.* Nichol, seems in substance never to have been departed from. "There are," said his lordship, "many obvious cases of new buildings darkening those opposite to them, but not in such a degree that an injunction could be maintained, or an action upon the case which however might be maintained in many cases, would not support an injunction." In that case an injunction was dissolved upon an undertaking on the part of the defendant, if the verdict upon the trial promptly had, should be against him, to remove such of the buildings complained of as should be proved in a material and improper degree to affect the plaintiff's ancient lights.

It was held also in the leading case of Back *v.* Stacey, that in order to give a right of action and sustain the issue, there must be a substantial privation of light sufficient to render the occupation of the house uncomfortable, *and* to prevent the plaintiff from carrying on his accustomed business on the premises as he had formerly done. With the single exception of reading *or* for *and*, I apprehend that the above ruling correctly lays down the doctrine in the manner in which it would now be supported in an action in the Supreme Court of Judicature.

Lord Cranworth made some observations in Clark *v.* Clarke, which were originally supposed to imply that there was some difference between the right of a person residing in a town and the right of a person residing in the country to be protected in respect of obstruction of ancient lights. But soon after that case his lordship's own decision in Yates *v.* Jack, dispelled any such idea, and laid down the rule that the owner of ancient lights was entitled, not only to sufficient light for the purpose of his then business, but to all the light which he had enjoyed previously to the interruption sought to be restrained. In Dent *v.* The Auction Mart Company, Lord Hatherley (then Vice-Chancellor) reviewing the state of the law relating to ancient lights, referred with approbation to the parent cases of The Attorney-General *v.* Nichol, Back *v.* Stacey, and Yates *v.* Jack. "The principle," said his lordship,—

"on which the Court interferes in these cases is somewhat analogous, as far as value can be compared with comfort, to the case of specific performance where the Court says it is not enough to pay a man a sum of money, he is entitled to have the specific property which he has acquired and to be relieved against the breach of the contract. In all these cases the questions are, first, whether damages would be recoverable; and secondly, whether the damages, if recovered, would be such as to authorise the Court to interfere."

The easement of the owner of a dominant tenement to have his light and air unobstructed by newly-erected buildings is not lost or diminished by the circumstance that, by means of clearances effected in the neighbourhood by other parties shortly before the alterations, he acquired more lights than the buildings could obstruct.

The Prescription Act has not altered the law as to the nature and extent of light to which the owner of an ancient light is entitled. "The nature and extent of the right before that statute" (citing from the judgment of the Lord Justice James, in Kelk *v.* Pearson),—

"was to have that amount of light through the windows of a house which was sufficient, according to the ordinary notions of mankind, for the comfortable use and enjoyment of that house as a dwelling-house if it were a dwelling-house, or for the beneficial use and occupation of the house if it were a warehouse, a shop, or other place of business. That was the extent of the easement,—a right to prevent your neighbour from building upon his land so as to obstruct the access of sufficient light and air to such an extent as to render the house substantially less comfortable and enjoyable."

In the same case Lord Justice Mellish said:—

"The right to light and air at the present time by no means depends exclusively upon the statute. A right to light and air may be gained, and in many instances is gained, by implied grants from persons who were the owners of houses upon lands adjoining. Before a house had been erected twenty years, or even if it had been erected twenty years, no light could be gained so long as the land on which any obstruction could be placed was the property of the same owner; but it is perfectly settled that if the owner of a house sell land on which an obstruction might be erected, or sell the house and reserve to himself the land on which the obstruction may be erected, the right to light and air is gained by implied grant from what is called the disposition of the owner of the two tenements."

Lord Chancellor Selborne, in the City of London Brewery Company *v.* Tenant, expressed his complete adherence to the view of the law taken in Kelk *v.* Pearson.

In the recent case of Kino *v.* Rudkin, it was decided by Mr. Justice Fry that, since the Judicature Act, as before it, a plaintiff in an action to restrain an alleged obstruction to ancient lights cannot obtain an injunction unless he proves substantial damage. In Kino *v.* Rudkin the further very important rule was laid down,—that an inquiry as to damages will not be directed where the plaintiff has opened a case of substantial damages and has failed to prove it.

It is impossible to lay down any rule as to what would constitute sufficient damage upon which to ground an application. But the result of the authorities may be, I think, shortly stated thus:—It is not every impediment to the access of light or air which will warrant the interference of the Court by way of injunction, or even entitle the party alleging himself to be injured, to damages. In order to found a title to relief in respect of such an impediment some material or substantial injury must be established, and the onus of proving the injury rests upon the plaintiff.

AS TO THE ANGLE OF FORTY-FIVE DEGREES.

It may be useful, however, to make some few observations as to the doctrine regarding the statutory rule touching the angle of forty-five degrees. The Metropolitan Board of Works, under statutory authority, by a bye-law passed in 1856, prescribed in effect that every new street within the limits of the metropolis must be of the width of 40 ft. at the least, but if the building fronting any street be more than 40 ft. high from the level of the street, then such street must be of a width equal at least to the height of every building above such level. And by the Metropolitan Local Management Act, 1862 (25 & 26 Vict., c. 102, s. 85), it was provided that:—

"No building, except a church or chapel, shall be erected on the side of any new street of a less width than 50 ft., which shall exceed in height the distance from the external wall or front of such building to the opposite side of such street, without the consent in writing of the Metropolitan Board of Works; nor shall the height of any building so erected be at any time subsequently increased so as to exceed such distance without such consent; and in determining the height of such building the measurement shall be taken from the level of the centre of the street immediately opposite the building up to the parapet or eaves of such building."

Lord Selborne, in The City of London Brewery Company *v.* Tenant, after stating that, with regard to the 45 degrees, there was no positive rule of law upon that subject, and that the circumstance that 45 degrees were left unobstructed was merely an element in the question of fact whether the access of light was unduly interfered with, held that there was

"Undoubtedly ground for saying that if the Legislature, when making general regulations as to buildings, considered that when new buildings are erected the light sufficient for the comfortable occupation of them will, as a general rule, be obtained, if the buildings to be erected opposite to them have not a greater angular elevation than 45 degrees; the fact that 45 degrees of sky are left unobstructed may, under ordinary circumstances, be considered *prima facie* evidence that there is not likely to be material injury."

The question again came under consideration by the Master of the Rolls in Hackett *v.* Bains. The plaintiff in that case was the owner of extensive messuages in Jewry-street, in the City of London, the owners and occupiers of which had had uninterrupted enjoyment of light for above twenty years. The defendants were erecting a warehouse opposite to the plaintiff's premises on the site of some old buildings, part of which only subtended an angle of 38°, and other part an angle of 27° above the horizon at the centre point of the ground windows of the plaintiff's houses. The defendants desired to build their warehouse 52 ft. high, and had carried it up to the height of 46 ft., which subtended an angle of more than 45° at the foot of the plaintiff's ancient lights by about 1 ft. or 1½ ft. His Lordship said:—

"The real question I have to decide is this:—In a street a good deal narrower than ordinary streets, not being more than 38 ft. 6 in. at any point across, and other parts only 34 ft., is a building owner entitled to erect a building to a height which will obstruct the access of light below the 45 degree angle. I say that as a general rule he is not. In cases of this kind, positive evidence being unobtainable because the building is not erected, you must go upon theory, and that theory, of course, must be the opinion of skilled persons,—persons who have paid attention to the effect of buildings on light. But on this point the Court is not left to guess or to arrive at an arbitrary conclusion upon the evidence of witnesses, because, in the first place, the point has been considered by the Legislature, and after considering the result of professional opinions, the Legislature has adopted the angle of 45 degrees as the proper angle, below which the incidence of light ought not to be permitted to fall, in the case of buildings on the opposite side of an ordinary street; and that view has been sanctioned by the Court, whose decisions are binding upon me, even if I differed from them, which I do not."

And after referring to the City of London Brewery Company *v.* Tenant, his lordship proceeded:—

"So that on being satisfied that 45 degrees are unobstructed, I ought *prima facie* to come to that conclusion, unless there is something special in the case. Now what is special in this case is in favour of the plaintiff. In the first place, as I have said, the street is rather narrower than it ought to be. The legislative rule applies to a street of the ordinary width. In the next place, there is some positive evidence that the present height of 46 ft., a little over 45 degrees, has interfered with the access of light not to an inconsiderable extent, and has actually caused personal inconvenience to one of the occupiers of the houses, I do not say that that alone would be conclusive."

And an injunction was granted to restrain the defendants from erecting the new building at a greater height than 46 ft. from the pave-

ment or base line. This was not, however, to prevent the defendant from making a sloping roof of a greater height, so long as the angle of incidence of light over the roof to the centre of the ground-floor windows of the plaintiff's houses did not exceed 45 degrees.

The subsequent case of Theed *v.* Debenham is another illustration of what the Court will consider a special case, to which the rule as to the 45 degrees does not apply. In Theed *v.* Debenham, the ancient lights of a sculptor had a north aspect in a street in the metropolis, 31 ft. wide. In the course of his profession he required, not only a direct light, but what is technically termed an under or low light, and which he had hitherto enjoyed. Some of the ancient windows had been enlarged within twenty years. The defendants' old buildings on the opposite side of the street were, as to part, exactly 31 ft. high, and as to the other part, a little less than that height. They intended to raise their new buildings so that their new parapet would be 38 ft. from the pavement, and their ridge of roof about 7 ft. above the new parapet, and they claimed to have a statutory right to raise their building to a height which would subtend an angle of 45 degrees, measured from a base line, level with the centre of the plaintiff's light. It was proved that if the defendants raised the new building to the height proposed the plaintiff would sustain a serious diminution of light, and it was held by Vice-Chancellor Bacon that the statutory regulation as to the height of buildings in streets is not to be taken as limiting the right of prescription to ancient lights, but that such right depends upon the degree and amount of obscuration in each particular case. "In my opinion," said the learned Judge, "they have no more right to take away the light which the plaintiff has been enjoying than they have to take away the front wall of his house," and further, "No man can be heard to say that he may obscure another's ancient light because he has more light than he requires."

On the other hand, where there are no special circumstances, the statutory rule has been held to apply. Thus, in the recent case of Harris *v.* The London and South-Western Bank, heard before Mr. Justice Fry in the last long vacation, an injunction was successfully resisted on the ground that the new building did not subtend the angle of 45 degrees, and that there was no special circumstance to take the case out of the general rule.

ALTERATION OF ANCIENT LIGHTS.

There is yet another subject relating to the *alteration* of ancient lights which ought to be discussed at length, but it is impossible that I can do justice to the subject within the limits of my present paper, and I think, therefore, that I ought merely to refer you to the decision of the House of Lords in Tapling *v.* Jones, which (overruling Renshaw *v.* Bean and Hutchinson *v.* Copestake) decided that the opening of a new window, being in itself an innocent act, could not therefore destroy existing rights in one party, or give new or revive old rights in another, and that, consequently, when there was an ancient light, and then others were added, and an obstruction was raised against the added lights, which, from their position, could not be obstructed without obstructing the ancient light, such obstruction was illegal. And to refer you also to the recent most important case of The National Provincial Plate-Glass Insurance Company *v.* Prudential Assurance Company, in which, not only the question as to the alteration of ancient lights, but the considerations on which the question of injunction or damages depends, were fully discussed. In that case, a building containing ancient light was pulled down and replaced by another, in which the front was set back and a dormer window converted into a skylight, and it was held that the right to reception of light was not lost. That any substantial alteration in the plan of the windows destroys the right (see the judgment of the Master of the Rolls upon the motion for injunction), and that the right remains where any portion of the light which would have passed over the servient tenement through the old windows passes also through the new windows.

Destruction of a Theatre by Fire.—The firemen were called early the other morning to the Cardiff theatre, which they found burning fiercely. The building was soon completely gutted, and all the dresses, scenery, and "properties" were destroyed.

IMPORTANT DISCOVERY IN APULIA.

Much excitement has been created in art circles of Naples by an archæological discovery of great importance. An underground city, another Pompeii, has been discovered near Monte Gargano (in Apulia), by the merest accident, in cleaning out a well. The first building met with, on excavations being commenced, was a temple of Diana; next came a portico, 64 ft. long, of columns without capitals. The works being continued, a subterranean necropolis, of an area of nearly four acres, was finally laid bare. Many important inscriptions have already been brought to light, and some of them have been exhibited in the National Museum at Naples. The discovered city is identical with the old Sipontum (near Arpinum), mentioned by Strabo, Polybius, Livy, and others. It was not overwhelmed by a rain of ashes, but subsided during an earthquake. Its houses are now 20 ft. below the cultivated soil.

The Italian Government has already taken the necessary steps for continuing the excavations on a grand scale. It is being laudably supported by the efforts of the citizens of Manfredonia and its archbishop. The Manfredonia of the present day (founded by the son of Frederick II.) is built partly on the site of classic Sipontum, without any one being aware of the treasures hidden below. Fresh discoveries are now of daily occurrence. Amongst them is a monument erected by the citizens of Sipontum in honour of Pompey after his victory over the pirates. Sipontine coins have also been found. But the greatest yield is expected from the classic necropolis, with its numberless sepulchres.

THE CLUBS IN AUTUMN.

The first indication that a Club, ornithologically and metaphorically speaking, will moult ere long is made by the arrival of a band of experts, skilled artificers who pry about, probe into, and test everything structural and textural, most determinately bent on noting all apparent and hidden defects. Fabrics are scrutinised and held up to the light, just as Old Clo', the Jew, turns about and exposes to view your cast-away coat and castor. The strength of furniture, firm and stable-looking, is tried; the bars of iron framework of grates are knowingly tapped, like the wheels of a railway-carriage by a porter; or the human intellects by a mad doctor endeavouring to ascertain if there be a cracked or sound mind. These parties prowl about in a stealthy manner; every now and then lay their heads together and consult in a low tone of voice, like so many conspirators plotting and keeping secret their crafty designs how best to mulct the Exchequer. A thorough exploration and examination is made of every material thing in the building from top to bottom, with one notable exception—the wine-cellar.

At these times that high functionary, the secretary, emerges from obscurity. Always oracular and mysterious, he now becomes more so, and to such an extent that both these qualities seem to be intensified to the highest degree. He paces slowly about in a meditative mood, evidently anxious about passing and forthcoming events.

We move onward a few weeks, during which the trees have shed their dead leaves and the Clubs their faded feathers. Well-fledged wings are now widely extended, offering shelter to numerous flocks returning from their migrations in foreign parts to settle down in their old haunts and homes. Some high-soaring, far-flying birds of *bon ton*, such as woodcocks and the like, travellers and wanderers, make direct for Pall-mall. Others of less lofty flight and less distinguished plumage distribute themselves in various regions westward, while the unaristocratic and more business-like birds wing their flight eastward, far beyond the Temple and its tottering Bar.

We here have another illustration of the oft-repeated adage as to birds of a feather. On this point of plumage let us reflect a few moments. Most true it is, as we have just shown, that birds of a feather flock together, but we denounce as utterly untrue the popular saying that fine feathers make fine birds. For when returning to our old domicile, after the autumn manœuvres are over, we find a dark, dingy, dismal, dirty dado daubed over and disfiguring the delicate tint which formerly extended from the head of the surbase to the moulding on the cornice; and further, when we come across flaring flamboyant tracings in passages and on panels, an irresistible feeling arises, that a sort of combination of pot-house and gin-palace style of decoration has been introduced, coarse, pewtery, and glaring.

In an ornithological sense, the conviction is forced upon us that a false and black *rara avis* has entered the land, and we would fain fall back on the true old white swan, even if disfigured and deformed by having two necks.

BOSTON SPA CONGREGATIONAL CHURCH.

The new church for the Congregationalists of Boston Spa is built in the main street of the village, and was opened on the 24th of October last. It consists of a nave with small transepts, porch, lobbies, and tower, and will seat 260 persons. The length of the nave internally is 53 ft., its width 34 ft., the width across the transepts being 43 ft., the whole roofed in one span, with open timbers, and boarded. Its acoustic properties are described as satisfactory. The seats are open benches, and the walls are lined to a height of 3 ft. with wood.

The tower, which is intended to form a staircase to give access to an end gallery to be added at some future date, is 50 ft. high, and has a slated spire, the total height to the top of the finial being about 90 ft. The buildings are enclosed by a low boundary-wall and palisades, and the plot so enclosed includes sufficient space for a minister's house, which it is intended to build when means can be obtained. The design was supplied by Mr. F. Bartram Payton, of Bradford, architect, who superintended the execution of the works. The mason's work was done by Mr. Robert Brelsford, of East Keswick; the joiner's work by Mr. Bake, of Wetherby; the plumber's work by Mr. Story, and the slater's work by Mr. Rawlins, both of Leeds; and the painting by Mr. Walker, of Idle. The heating apparatus (which is Howorth's hot-air system) was supplied by Messrs. Taylor & Parsons, of Bradford, who also supplied the communion rails. The palisades were made by Messrs. Beckwith, of Brighouse; and the gas-fittings were supplied by Messrs. Freeman & Collier, of Manchester. The total cost is about 3,000*l.*, of which amount 372*l.* were paid for the land.

Behind the church, and on the same level, is a school-room, 30 ft. by 25 ft., with separate entrance, class-room, minister's vestry, and lavatory.

The drawing we have engraved was put upon the wood by the Cryptotype process, some particulars of which will be found on another page.

ANCIENT HOUSE AT OCHSENFURTH, BAVARIA.

The old villages, or rather "dwarf towns," of Germany, especially those upon the Rhine, the Main, the Moselle, the Lahn, and the Danube, in parts of Westphalia, Saxony, and Hanover, abound in examples of ancient timber houses. It is, however, highly advisable that drawings of these interesting examples of Mediæval architecture should be made and preserved as records, for every year sees hundreds of these picturesque edifices destroyed.

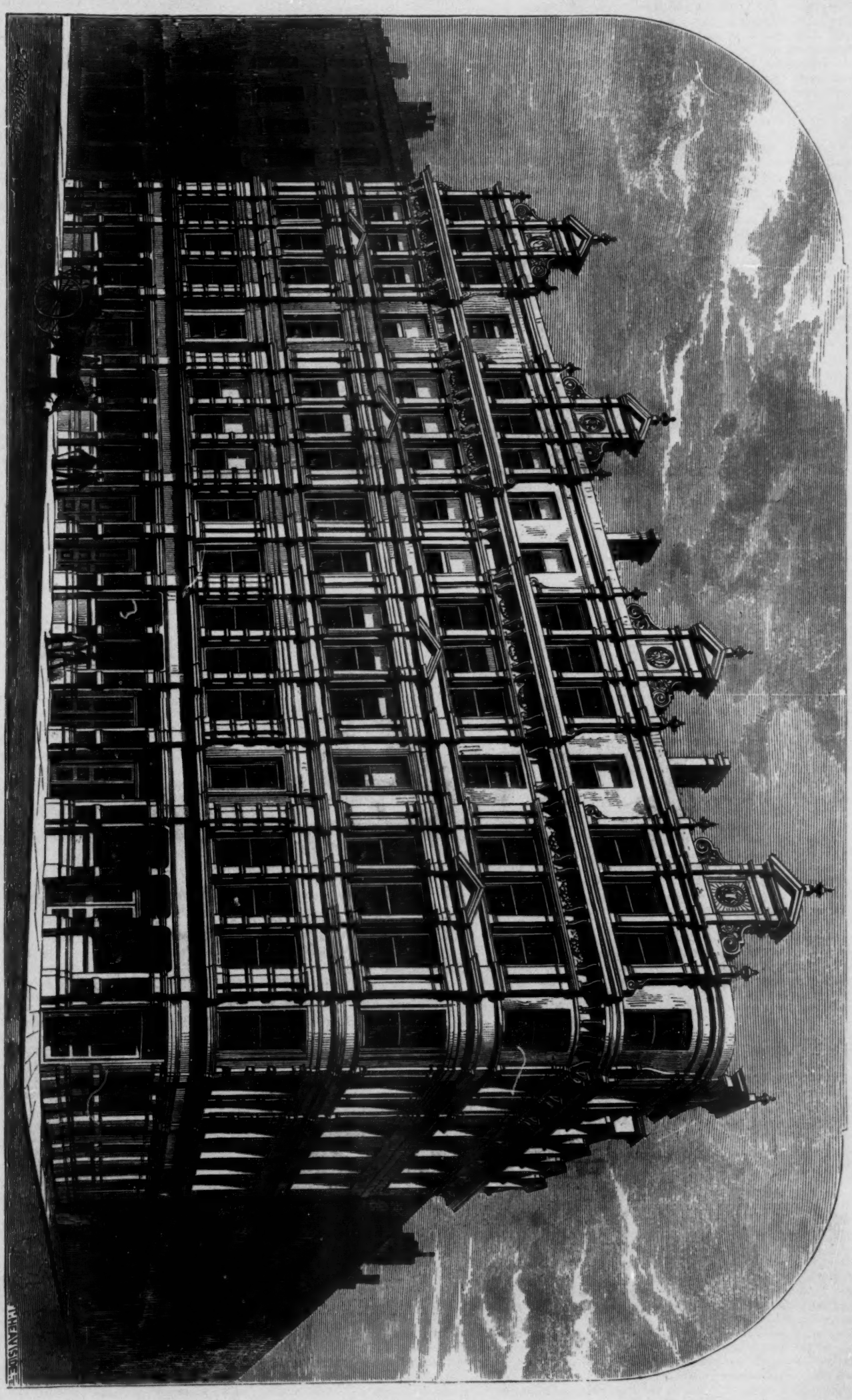
Many of the ancient timber, and even of the stone-constructed, houses which have been published in this journal have, since they were drawn and engraved, disappeared. As examples, we may mention that the houses at Hildesheim, Boppard, and Wurzburg, of which we gave illustrations some three or four years back, have ceased to exist; and probably the drawings which we published are the only records left of them.

The building of which we give a view in our present number is a good example of what is called "post and pan work." It dates from the commencement of the sixteenth century, and is in a very perfect condition. As will be seen from our illustration, in addition to the perpendicular, horizontal, and diagonal timbers, we have here ogee-curved braces, which in some cases are richly cusped. The stories of the building are separated by flat moulded timbers, consisting of alternate beads and flat hollows, which give a rich architectural effect. As this house is built against the city wall, the front shown in our view is the only one visible.

Royal Academy Architects.—On Thursday evening, the 13th inst., Mr. Norman Shaw was elected R.A.

BOSTON SPA CHURCH.—Mr. F. B. Payton, Architect.

ANCIENT HOUSE AT OCHSENFURTH, BAVARIA. Sixteenth Century.



LONDON STREET ARCHITECTURE: HOUSES IN CANNON STREET.—MESSRS. TAYLOR & LOCKE, ARCHITECTS.

LONDON STREET ARCHITECTURE: HOUSES IN CANNON STREET.

THE important block of buildings which we illustrate this week is situated in Cannon-street, London, at the junction with Queen Victoria-street, and immediately opposite the Mansion House Station. The principal frontage is to Cannon-street, and measures 112 ft. There is also a return frontage of 50 ft. in Bow-lane. Some difficulty has been experienced, in consequence of the desire of the architects to obtain a uniform façade, whilst the land was subdivided into irregular frontages, and the buildings were erected for different owners.

The corner house is being built for Messrs. Chapman, Bros., for the purpose of a tavern, there being a grill-room in the basement, and smoking and billiard rooms on the upper floors. The adjoining warehouse is being erected for Messrs. C. & J. G. Potter, paper-stainers, of Darwen, Lancashire; the next warehouse, for Messrs. Jonas Brooks & Bros., of Huddersfield, Yorkshire; and the farthest warehouse for Mr. Henry Woods, of London and Paris. The three last-mentioned premises have large packing-rooms in the basement, warehouses on the ground-floor, and offices on the upper floors.

The external walls are built with Tisbury stone, with polished Shap granite pilasters to the ground-floors. The roofs are covered with Broomhall tiles. The sanitary apparatus has been supplied by Messrs. J. G. Stidder & Co. The carving and plaster enrichments have been executed by Messrs. Smith & Finley, and the fittings of the tavern by Messrs. Macey & Taylor. The whole of the works have been carried out by Mr. J. Morter, contractor, of Stratford, from the designs and under the superintendence of Messrs. Taylor & Locke, architects, of Basinghall-street.

THE CRYPTOTYPE PROCESS.

CRYPTOTYPE is a new photographic process for rapidly obtaining pictures upon boxwood blocks for engraving. To persons unacquainted with photography and engraving, it no doubt seems as easy to produce a photographic image upon wood as it is to print a photograph upon albumenised paper, but there are three very great difficulties in the way of printing a photograph upon wood. 1. If an attempt is made to prepare the wood in the same way as sensitive paper is prepared, some change takes place in the wood which turns it to a mahogany colour. 2. The usual photographic preparation also injures the wood. 3. Photographs upon paper have to be subjected to repeated washings; now if boxwood is washed or placed in water it is greatly damaged for engraving purposes. For some years past photographs have been placed upon wood for engraving by dexterously peeling films off glass and transferring them backwards on to boxwood blocks. But a film of collodion on a boxwood block is highly objectionable in several ways. 1. In fine work the engraver does not know whether he has cut through the collodion and reached the wood, and if the wood is not reached, then, when the block is cleaned, the engraver has to re-cut his work, for the fine engraving will have vanished with the film. 2. Sometimes the collodion will peel off like a pancake. 3. At other times it will be brittle, and so pieces of the picture will fly away from the wood at the touch of the graver. A process is known for removing the collodion, but this leaves the print so pale, unsatisfactory, and evanescent, that it rubs off on being touched with the fingers, and in some methods if the block is kept in the light it turns wholly black. Hitherto all attempts have ended in brown or grey pictures, and these colours are objectionable in wood engraving. The process perfected by Mr. Arthur E. Smith, of 15, Mildmay-grove, London, entirely gets over all these difficulties, for the block is never placed in water or washed, there is no preparation of the wood, and there is no collodion. All that is present upon the naked wood is a permanent black image of the object copied. The discovery (particulars for obvious reasons are kept secret) was not accidental. It was only arrived at after nearly three years' incessant daily work in one direction. Nearly every day of all this long period saw a more or less disheartening and often expensive failure. That it is a success there is no room for doubt, as during the last six months it has been largely tested in different directions by many engravers, and always with uniform and perfectly satisfactory results. The process is also adapted for producing an enlarged image on the wood of any object direct from the field of the microscope. If all we hear be correct the process ought to prove of value.

ANCIENT GREEK ART.

ON Saturday evening, the 15th inst., Mr. C. T. Newton, C.B., of the British Museum, delivered the last of the series of lectures on "Greek Art," at the College for Men and Women, Queen-square, Bloomsbury. The three previous lectures have been reported in the *Builder*.

Mr. Newton said that in his previous address he treated of the last stage of archaic art, bringing down the history to the year 460 B.C. The reason he chose that particular date was because Phidias, the pupil of Ageladas, flourished about that time (it being pre-eminently the age of Pericles), and accomplished the greatest work of the whole period. He proposed that evening to deal with the time extending from 460 B.C. to 400 B.C., which might be called the first great period of Athenian art. In the three previous lectures he had traced the development of Greek art in Asia Minor. It was after the great victories of the Persian War that Athens, under a succession of great statesmen, attained to a vast maritime empire, and in that same period she became eminent in literature, there being produced those celebrated dramatic works of her tragedians, Æschylus, Sophocles, and Euripides, while Aristophanes was an unrivalled writer of comedy. There were also produced those architectural works of Phidias which still remained on the Acropolis. The earliest part of this period was very pleasant to contemplate. It was one of those cases in the history of humanity that the mind loved to dwell upon. At the time there was this great development of art, measures were taken by the leading statesman of the age of Pericles to delight and instruct the people, notably by dramatic representations, at which the poor as well as the rich were admitted free. The price of corn was kept down by artificial restrictions; jurors were paid for attendance at tribunals; and as much of the menial work as possible was done by slaves, so that the poorer citizens had an easy time of it. With reference to the costly buildings that were then constructed, the practical question arose, Where did the money come from? The money came from several sources, the principal source being opened up in consequence of the Persian War. The Athenians were successful in crushing the naval power of Persia, after which the battle of Eurymedon was fought, which ended the Persian War. The protection of a number of Greek States on the coast of Asia Minor was then undertaken as a public duty, a maritime confederacy being formed, each member of which bound itself to contribute, either in ships or money, a certain quota towards the common expenses. The result of this was that on the sacred island of Delos there was erected the great temple of Apollo, where the treasure of the confederacy was kept. The Athenians had dominant power in the confederacy, there being, however, a certain equality established among the members. After a time the Athenians got stronger, while the confederacy became relatively weaker, and the treasure was placed under the control of the Athenians themselves, and transferred from Delos to Athens, these allies becoming contributors. The surplus money, after paying the military expenses, was appropriated first of all to the service of the Athenian gods as pleasing and acceptable offerings. He mentioned this circumstance because it was important to know precisely the conditions under which art flourished. They were aware that before the Persian War Athens was almost an unprotected city. There was a wall around the Acropolis which the Persians destroyed; but there was no fortification connecting the harbour of Peiræus from Athens itself. The first thing done was to connect the port by this wall, so as to make the place perfectly secure; and this being accomplished, the military importance of the Acropolis itself was considerably less, and accordingly the Athenians began embellishing it. It was a great rocky citadel, situated on the top of a square craggy rock, 150 ft. high, with a flat summit 1,000 ft long, 500 ft. broad, and stood in the centre of Athens. All along the coast rose splendid buildings, and the whole of the magnificent prospect was crowned by the Acropolis, where all the most glorious monuments of Athens were assembled. With regard to the architecture of the period, what the domestic buildings were they did not know; but he (Mr. Newton) thought that they were rather of a mean and contemptible kind, being probably built of perishable material, because there were no traces of them left. What they found, however, were the remains of temples which were built with a degree of care and excellence which perhaps had never been surpassed. They knew that the State first appropriated a certain sum for the building of these temples, and that contracts were entered into, he supposed, "for the lowest tender." Surveyors, too, were appointed, and he must say that a temple, in the age of Pericles, was built with the same amount of precision and care as a ship of war would be under Government inspection. For the buildings the finest marble was chosen, and the work was executed with a delicacy which he could only compare to the best cabinet work of the present day. Most minute specifications were prepared of all the materials necessary for the building, each block of marble being perfect for the place for which it was intended. There was, too, an elaborate system of supervision, officers being appointed by the State to superintend the erection of the buildings. With regard to the Erechtheum, the most venerated of all Athenian sanctuaries, at a particular stage the building of it did not get on fast enough, and a commission was appointed to inquire into the reason. All these circumstances showed how well ordered matters were, and the impression that one received from a study of the institutions of Athens in the age of Pericles showed how careful the State was in reference to its public works, the Athenians producing buildings which were the admiration of the world, being models of adoration and reverence. The Propylæa, all built of white marble, formed the entrance to the Parthenon, and its ruins now existed. It was said to be intended for the defence of the Acropolis, but he thought it was now agreed that it was a grand vestibule for processions, because at the time it was erected Athens might be considered clear from invaders. Above the Propylæa stood the colossal statue of Athenè Promachos, which was a work in bronze, and must have been the greatest feat of casting in antiquity. It was by Phidias, and was between 50 ft. and 60 ft. high. It was one of the three statues of Athenè which were placed in the Acropolis. With regard to the Erechtheum, it had always been a puzzle, and was, in fact, two or three temples in one. Before the Persian War there was a very ancient statue of the goddess Athenè, and in the temple where it was placed there was a live olive-tree, which was an object of veneration to the Athenians, and was supposed to be the parent tree from which all the live trees in Persia sprang. There was a curious connexion between this goddess and the olive-tree. Athenè was in some sort a goddess of light—ether—and Attica derived a great deal of its revenue from the excellent oil derived from the olive-trees. The lamp fed by the oil was sacred to her in this temple, and the wick, it was said, only required trimming once a year, which, if true, must have been a very remarkable wick. After the Persian War this ancient statue of Athenè was renewed, and the young ladies of Athens used to bring to it embroidery work as offerings. With respect to the Parthenon, this great temple in a ruined state was still standing, and of its architecture there were a few samples in the British Museum. Parthenon meant the Temple of the Virgin, and in it were deposited the treasures of the State. As regarded the art of making images of gold and ivory, which was known as chryso-elephantine, it was extensively practised amongst the Greeks. Winckelmann had calculated that about 100 statues of this kind were mentioned by the ancients. The combination of gold and ivory was chiefly used in temple statues; and though the execution of the more famous works of this class belonged to an advanced period of art, the use of various materials in the same structure was very ancient, and probably borrowed from the custom of adorning the wooden images of the earliest time with the precious metals. Coming to the question as affecting the resources of the State, Thucydides told them that the goddess, the Pallas of the Parthenon, which was executed by Phidias, had on her person, in gold garments, an immense sum,—he might say a fabulous sum,—the gold being borrowed and converted into money in cases of extreme destitution on the part of the State when money was wanted to pay the soldiers in times of war, and returned in more

prosperous times. It would be very convenient for the Turks at the present day had they such a goddess to borrow from, for, depend upon it, the gold would be melted down to supply "the sinews of war." In the Russian monasteries, large revenues were attached to them, and from what he (Mr. Newton) had been told from a friend, who had recently returned from Russia, the authorities of the monasteries had promised to pay over any amount to carry on this "Holy War." It was in the making of the statue of the Olympian Jupiter that Phidias earned his fame. The Theatre of Dionysius was uncovered by the Germans about the year 1855, and then it was found that the principal seats were set aside for the chief personages of the State,—marble chairs being reserved for them. Last year considerable excavations were made in this place by the Greek Archæological Society, the work being carried out by private subscriptions. With reference to the Temple of Victory, portions of its frieze were now in the British Museum, but the great work of Phidias was the chryso-elephantine statue of the Olympian Jupiter, which had long since disappeared, they not having any clear idea what it was like, having to rely on the descriptions of it given by the ancients; but the Temple of Jupiter in which it was placed had recently been disinterred, owing to the labours of some Germans, who had been sent there to excavate. The principal columns were there, and what was more important the sculptures in the two pediments, one of which, according to Pausanias, was by Alcamenes, and the other by Pæonios, of Mende, had been in great part recovered, showing that the work had been carefully and completely done. This same Pæonios made a victory at Olympia. They had thus undoubted works by particular artists of the age of Pericles. The imperfect execution of the pedimental compositions at Olympia might be illustrated by a comparison of the Phygalian frieze, that of the Erechtheum, and the frieze of the Xanthian monument of Phidias himself. Where there was a great gathering of the most skilful carvers in marble, as at Athens, and also abundant wealth, the execution was almost perfect; when Athens grew poorer, at the end of the Peloponnesian war, the artists were not so well paid, as they saw by the account of the building of the Erechtheum, in which the actual sums paid to individual sculptors of groups and figures were noted. The inferiority of the execution was evident at Phygalies, but still more evident at Olympia, and at Xanthus, in Lycia.

The other two eminent sculptors who flourished about this period were Myron and Praxiteles, the latter being celebrated for his figures of the athletes putting diadems round their heads. With respect to painting, they had nothing to refer to except the vases of the period, some of which were in the British Museum.

In conclusion, Mr. Newton regretted that, owing to pressure of business, he could not pursue the course of lectures, but trusted next autumn he would find it convenient to resume this subject. In the meantime, he hoped that all his hearers would study hard the valuable works of art to be found at the British Museum, for it was the repetition of the impression this subject gave that made ancient art valuable.

A cordial vote of thanks was accorded to Mr. Newton before the meeting separated.

THE DEVELOPMENT OF GOTHIC ARCHITECTURE.

ARCHITECTURAL ASSOCIATION.

In the discussion which followed the reading of Mr. J. J. Stevenson's paper, the substance of which we gave in our last,

Mr. R. Phené Spiers said that if Mr. Stevenson's purpose had been to read the funeral oration of the Gothic style, he had begun, on the principle *de mortuis nil nisi bonum*, by pointing out how truthful Gothic was in its earlier developments. Gradually warming up in his subject, he showed how debased the later forms had become, and pointed out the difficulties which arose in applying the style to modern wants. He had referred to the shams and reproductions of our fathers, and after remarking that doubtless our dislike of the later phases of Gothic was due to the bad copies of forty years ago, he suggested that thirty years hence people would be disgusted with the reproductions of the present day. Therefore Mr. Stevenson hoped that more particular attention would be directed to the "Queen Anne" style, of which he was the apostle. He confessed to being somewhat disappointed with the paper, for Mr. Stevenson generally had many new arguments to bring forward. He believed Mr. Stevenson was about to publish a book,—an architectural history,—and that the paper formed part of the coming book. Now, although of course it was impossible to write an altogether new history of architecture,—for the writer must base his statements on facts,—he regretted that Mr. Stevenson had taken as almost his sole guide M. Viollet-le-Duc, who had totally neglected one of the most important phases of Gothic work,—a phase which must be dealt with in any history of Gothic architecture to be read by Englishmen, viz., fan-vaulting. He disagreed with Mr. Stevenson when he said that the developments of the Gothic style were similar in France, England, and Germany.

Mr. H. W. Brewer did not agree with Mr. Spiers in saying that fan-vaulting was the origin of the four-centred arch. It was a remarkable thing that in churches which had fan-vaulting the windows of the clearstories were not four-centred. In the lady-chapel at Peterborough Cathedral the windows were not four-centred: they were rather sharp than otherwise. Again, King's College Chapel, Cambridge, was entirely covered with fan-vaulting, but with the exception of the east and west windows none of the windows were four-centred. In Henry VII.'s Chapel, at Westminster, if the windows were four-centred at all they were very slightly so. He agreed with Mr. Stevenson that the four-centred arch arose from the desire to give as much light as possible to the upper part of the wall. In Oxfordshire, and some other of the central counties, square-headed windows in the clearstories were quite common; internally a sort of flat segmental arch was used. There was a great deal to be said for Mr. Stevenson's suggestion to call the Perpendicular style the "Horizontal" style; certainly the horizontal lines were a distinguishing feature of the style, and they were often most strikingly emphasised by the massive square towers, cut straight off at the top, as in the fine example of Lavenham Church, Suffolk. Even in so thoroughly Perpendicular a building as King's College Chapel, Cambridge, where there was an enormous number of Perpendicular lines running up to the roof, the perpendicularity of the effect was broken up by angels carrying shields, which tended to impart to the interior the appearance of horizontality. He was glad to hear Mr. Stevenson speak so enthusiastically in favour of the Perpendicular churches, for he (Mr. Brewer) believed Gothic architecture never produced anything more perfect, dignified, and grand, or more fitted for places of worship, than the great Perpendicular churches such as those in Norfolk and Suffolk.

Mr. Maurice B. Adams, in reference to the latter part of Mr. Stevenson's paper, said he did not wish to assume the position of champion of the eminent architects whose works had been referred to, but it seemed to him that the paper took rather a partisan view; it certainly tended towards much that had been put forward in the battle of the styles. Now the true artist would erect a good building in any style, and he thought we should have reason to be proud if we looked back at the revivals of any period from the commencement of the present century. Works of great merit had been produced, and he did not believe that the best of them would ever cease to call forth the admiration of our successors. We had great reason to look back at the Gothic revival with pride, for buildings of the greatest beauty had been produced in it, whatever those who were in favour of other styles might think. If we were to have good buildings we must have good artists, and, as artists were few, good buildings must necessarily be few.

Mr. H. L. Florence said Mr. Stevenson concluded his paper by saying that Gothic architecture in the present day was the artistic expression of an obsolete mode of construction, but he (Mr. Florence) ventured to think that a style which had so many good qualities as had been pointed out by Mr. Stevenson must of necessity, even at the present day, have some life left in it. Its funeral oration had not yet been pronounced. The Cinque-cento, when at its lowest, sprang into a fresh existence; and as Gothic contained many elements capable of use, it might hope for a profitable career in the future. Cinque-cento had been out of fashion for some time, but, shorn of some of its most attractive qualities, it was again the fashion, even with some of the most glaring faults and defects of Gothic engrafted on to it.

Mr. Stevenson, in replying on the discussion, said that the question of fan-vaulting was dealt with in his paper, although he omitted reading that portion to save time. He was inclined to hold that fan-vaulting itself was a thing which especially needed explanation, and that explanation was probably to be found in the desire of the Perpendicular architects to keep their roofs flat. As an architect himself he confessed he should be quite willing, especially as he considered we were living in a feebler age as regarded architecture, and must live, to some extent, on the ideas of our predecessors, to put up buildings designed with features which, though not perhaps useful, were picturesque if not beautiful. But to concede this was to deny the pretensions of Gothic construction to be the outcome of necessity, and was a sad descent for those who had always maintained that Gothic was a true style, and the only true style, and that Classic was all false. Although old forms might be copied and re-used, it was surely a far nobler thing to throw them boldly aside, as did the old Gothic builders themselves, and trust to the necessities of the case to help them to develope new features in consonance with modern requirements. This required enormous skill and art. Engineers had had more opportunities of doing this than architects, for they had been entrusted with the execution of great works ministering to wants which were entirely modern. They had been most successful in their works where they had depended on simplicity and grandeur of outline rather than on applied ornament. At one time he (Mr. Stevenson) was as great an enthusiast as any one for Gothic; but more mature study had convinced him that it was not suited to domestic requirements, inasmuch as to be real it must have vaulting. Modern Gothic churches which were vaulted, such as St. Peter's, Vauxhall, were much more satisfactory than contemporary works not vaulted. Cost precluded the use of vaulting in the majority of cases, and without vaulting Gothic was as insipid as the play of "Hamlet" with the part of the Prince of Denmark omitted.

MORE ABOUT "DAMP."

Sir,—A year since (December 9th, 1876), you printed some observations of mine upon damp,—a subject which naturally comes round again with the season, as recent complaints from your correspondents indicate. I then showed that much of the damp, or even positive wetness, often attributed to the penetration of water through walls, is really due to other causes, such as the condensation of moisture from the air within the house, and the excessive consumption of gas. I desire now to point out, more particularly, the true cause of what is often mistaken for the passage of water copiously through carefully-built walls of brick or stone.

Ask any one that has built a good villa or mansion on an exposed site what he knows about damp, and it is much too probable that you will hear a doleful tale of wet walls and spoilt paper-hangings, though architect and builder have tried to do their best to prevent such a result. All are, of course, agreed that the water passes through the wall. If the brick or stone facing is not very hard it is treated with some indurating or water-proofing solution, with no good effect: so, while further steps are being considered, it may be useful to ask ourselves a few questions as to the behaviour of water in contact with walls in general. In the case of an ordinary house wall, built of good, though probably porous, bricks and a coarse lime-mortar, it is a matter of common observation that the rain "drives through" it, and runs down the inside in streams, as I have seen it run down a first-class mansion. Assuming that it is only 9 in. thick, do we see this regularly happen in common cottages and farm outbuildings, and do we see the rain drive through all 9-in. garden-walls, as must be the case with such structures, as a rule, if the theory of the penetration of rain were the true one? On the contrary, the usual experience is that heavy rain soaks for but a short distance into such brickwork as this, that the next spell of sunshine or drying wind takes most of it out; though, as we know that air will be drawn into a house through the walls, some little moisture may find its way along with it. But, as a fact, the fires which careful people keep up during damp weather amply suffice to keep such walls warm and dry. With regard to a house built with solid walls protected by good overhanging eaves and well warmed, neither water in bulk nor ordinary

damp should be seen, and if it is not dry there must be some defect in workmanship that requires to be studied on the spot.

Perhaps the case of one who has gone to the expense of hollow walls, and who has yet failed to secure dryness, is especially hard. For the first year or more all has gone well, but about the second winter, or in an unusually long wet season, spots of damp are noticed in the best rooms; soon the papering is wet, black, and mouldy, and the rooms uninhabitable. One may count the ties which bond together the two thicknesses of walls by these spots. This will happen, however hard the facing bricks may be, even though set in cement; indeed, such walls are the worst, as the wet which has penetrated into the hollow space is by them prevented from drying outwardly to any extent. The true cause of the mischief will be found in defective gutters and flashings at gables and chimneys, and the remedy will be found in better plumbing, which, however carefully it may be done as a matter of mere workmanship, is generally done without sufficient experience of all the ways in which water will penetrate in cases of unusual exposure to driving rain. A hollow wall will tend to keep a house warm, but unless the roofs are put on with the best and most expensive arrangements of gutters and parapets, they require, even more than solid walls, the protection of overhanging eaves and projecting gables; and chimneys of all houses require greater care in forming the lead flashings than is commonly given.

THOMAS BLASHILL.

P.S. The railway arch complained of by one of your correspondents may be dried,—first, by seeing that the covering of asphalte and concrete beneath the permanent way is sound, and then by using a stove, such as Galton's or Musgrave's, which supplies warm air to the room. The case of damp attributed to "sea salt" in the bricks seems due to deficient warmth in the rooms, which one of these stoves in the house would cure. A coarse porous plaster would have been better than Parian for the walls.

A TRUANT-SCHOOL.

LIVERPOOL ARCHITECTURAL SOCIETY.

THE fourth meeting of the present session was held at the Royal Institution, Colquitt-street, on the evening of the 12th of December, the president, Mr. J. M. Hay, in the chair.

A discussion took place with regard to the Council having issued their report on the Model Bye-laws of the Local Government Board to the public before it was adopted by the Society at a general meeting, thus compelling the Society to pass a resolution adopting the report in order to support the dignity of the Council, whose action in the matter was by many considered premature, and finally Mr. Nugent gave notice that he would propose at the next meeting, to be held on January 9th, 1878:—"That the resolution adopting the report of the Council on the Model Bye-laws issued by the Local Government Board be rescinded, and the whole matter more thoroughly discussed."

The designs submitted by the student members for a country church to seat 400,—period, fourteenth century,—being the first subject on the syllabus for this session, were exhibited.

Mr. T. Mellard-Reade, C.E., architect to the Liverpool School Board, then read a paper, of which the following is an abstract, on the "Liverpool School Board's Truant School, Hightown."

Mr. Reade explained that the Liverpool School Board, like other Boards, was met by the difficulty of dealing with truant children, but in Liverpool it was probably worse than in other places, owing to its seafaring character and the extent of its docks, which gave great scope to the truant propensities of the children.

After long and anxious deliberation, the Board effected a compromise between opposing views, and it was decided to divide the schools into two sections—one for Protestants and the other for Roman Catholics, and also to erect them at Hightown, on about two acres of ground.

Being an entire novelty no precedent in planning could be referred to, and the plans which were displayed as illustrations had to be thought out from first principles, strict attention being paid to economy.

The building will accommodate 136 children, 68 in each section. It consists of a main block 165 ft. by 38 ft., principally in two stories, the central portion being carried up one story higher. On the ground-floor in each section are the office, taskmaster's room, with an inspection bay commanding the corridors, ten separate dormitories, kitchen and other offices, and superintendent's parlour. A staircase affords communication between the three floors in the central block. The dining-room and school, with lavatories, are in wings forming one-story annexes. The laundry, wash-house, and drying-rooms, form a central one-story annexe, and can be used alternately by each section. At the south end of the plot are good workrooms made out of the moveable wooden schools from Walton-lane. A plunge-bath and small bath heated by the kitchen boiler, are in the main block in each section. On the first floors in each section are two parallel dormitories for twenty-nine boys each, both commanded from the superintendent's bedroom by an inspection bay, rooms for linen and Sunday clothing are provided, together with the necessary bedrooms for officers and servants. On the second story are situated the sick wards, with nurses' rooms and bath-rooms, &c., isolated from the rooms below. The site provides also for play-grounds and kitchen-garden space. The whole building is thoroughly warmed upon Harlow's system, and ventilated by Messrs. Potts & Co., the contractors being Messrs. Boardman Brothers, of Leigh; and the work is rapidly approaching completion.

In conclusion, Mr. Reade expressed a fervent hope that the scheme would prove a success, as it was undoubtedly conceived in a spirit of Christian charity for the reclamation of those unfortunates who, without discipline and control otherwise, from vice to vice go backwards to perdition.

A vote of thanks having been passed to Mr. Reade for his paper, the meeting came to a close.

THE STUDY OF COOKERY.

OUR notice of a recently-published Handbook of Cookery has led to some inquiries, which we briefly answer. The notes will probably not be deemed inappropriate by any of our readers at this season of the year, especially dedicated by Englishmen to feasting.

The National Training School of Cookery at South Kensington is the outcome of the Exhibition of industries and products in connexion with food at the International Exhibition of 1874, when Mr. Buckmaster was engaged to give lectures on cookery, with practical demonstrations by a staff of cooks. The lectures were very popular, and the next year a committee was formed and the school started, the commissioners lending them the iron building where the lectures had been held. The chief object of the school is the training of teachers to give instruction in cookery. Many schools are now in communication with the training school. Some of them are permanent; some only for a time; and much good has already resulted from the spread of a knowledge of good and economical cookery. We are glad to learn that ladies are shortly to be sent to teach it in America (by the Edinburgh School). We are glad to hear too, that the time to qualify a lady to become an instructress is extended from three to five months, and the fee raised to 20*l*. She then obtains a diploma. We strongly recommend young women, if they have the time at their disposal, to go through the course of training at the school, for both good health and good temper are dependent on well-cooked food; and "where is the man that can live without dining?" Cookery is an art, without doubt. Good cooking means economy; bad cooking, waste. Food should be so cooked that it shall retain all the nourishment possible; and without a certain amount of study and care this cannot be done. It is so taught at South Kensington. Sir Henry Cole, in his speech two years since, promised 100*l*. a year to any lady who qualified herself; but this, it seems, can be realised by only a few. The ignorance of women of the working-classes is constantly before us, and if ladies were more competent to instruct the former in their duties the comfort of home-life would be much increased.

The Edinburgh School of Cookery has been requested to send ladies to teach in America, and some are to start early next year. Cookery at South Kensington is taught by scullery work, demonstration lessons, and practice lessons. The demonstration lessons should precede the practice, because in them are shown the methods of preparing and cooking the food, and the pupils are thus better prepared to go into the kitchen to try for themselves. We are much inclined to think that the demonstrations have done much to make cookery popular; but we feel sure that, as the schools increase, they must fall off, because they will have served their purpose; when the novelty has worn off, the pupils want themselves to cook. Many persons have an idea that cookery is to be learnt from a book or these demonstrations; but, as with other arts, it is only by actual practice that a learner can become proficient. A Frenchwoman will make a savoury meal of what an Englishwoman will throw away, simply from the want of knowing how to utilise it. In Paris and Vienna they have better bread than we have, because scientific attention is given to the process. "Here we carry on most of our occupations as if an entire ignorance of their nature were a means of certain success. Is it then to be wondered at, that even in the manufacture of 'our daily bread,' we go to work in an expensive way, and produce an inferior and often injurious article."* An acquaintance with elementary chemistry, also with physiology, is a great advantage in cooking, as the more knowledge we can bring to bear on the simplest thing the more efficiently it will be done, and with the certainty of success. In the scullery the pupils are taught to clean all the utensils, and in nothing is perfect cleanliness so essential as in cooking. It is to be hoped that practical cookery lessons will be adopted in all schools, Board schools especially, as it is through the rising generation that the masses of the people are best reached, and we have heard already of several instances in which the cooking learnt at school has been practised at home to the great comfort and benefit of a sick mother. The Cookery School has a great and good work before it, and we heartily wish it the success that it deserves. The committee of the school have, at the same time, their duties, and must act up to them.

THE CHURCH OF ST. MARY, PATSHULL, NEAR WOLVERHAMPTON.

IN accordance with instructions from the Earl of Dartmouth, the tower of this church has been much altered and improved in the formation of a belfry, to receive a fine peal of six bells, made and hung by Messrs. Mears & Stainbank, of London, who have also applied their chiming apparatus for occasional use.

In making the necessary alterations to the tower the same difficulties had to be met as those which were felt by his Lordship to exist when he gave the instructions with regard to the extension of the church, by adding a north aisle, as described by us some two or three years back, viz., the extreme compactness and simplicity of the normal structure, which rendered it almost impossible to make an alteration in its outline in any direction without giving such alteration the appearance of being an excrescence. His Lordship was also very desirous to retain the general character and form of the original structure.

These difficulties have, however, been overcome, and a great improvement is made in the arrangements for ringing the bells, inasmuch as the ringers have now a commodious chamber (formerly the bell-chamber) approached by an external staircase instead of having to ring from the inside of the church as heretofore, in the position where the bells were formerly hung.

From the main cornice, which is almost on a level with the old ceiling or vaulting of this chamber upwards, the octagonal portion of the tower and dome was wholly removed, and the floor of the new bell-chamber is now at this level; the upper portion of the tower, which forms the new bell-chamber, being reconstructed from this point.

The character of the work is in keeping with the body of the church, consisting of a circular-headed belfry window, on each of the four sides embraced in the Tuscan order, with square quarter pilasters and rusticated angles. From the blocking over the entablature of the order rises the dome upon an appropriate base; this is covered with lead and crowned with a perforated cupola terminal, and gilded ball and vane surmounting the whole. The flag of the vane is the same that stood at the apex of the former dome. The circular windows on three sides of the ringers' chamber are glazed in place of the old louvres; and a handsome iron grille, by Mr. F. A. Skidmore, has been fixed in each. It is proposed to open a window into the church at the west side of the tower, where the niche with a statue of King Charles II. now stands.

* Dr. Lankester.

The entire height of the tower to the top of the vane is 86 ft.; the old tower to the same point was 71 ft.

The builder's work has been executed by Mr. Benjamin Graham, of Huddersfield, who has obtained the stone required for the work from the quarry in Patshull High Park.

An organ is now being built for this church by Messrs. Walker & Sons, of London, and will shortly be placed therein.

The whole of the works have been carried out from the designs and under the supervision of Mr. Wm. C. Banks, architect, of Gracechurch-street, London.

THE PROSPECTS OF ENGINEERS.

LIVERPOOL ENGINEERING SOCIETY.

This society held its last meeting of the year in the Rooms of the Royal Institution, on Wednesday evening, the 19th inst. Mr. Graham Smith, A.I.C.E., delivered a valedictory address on the "Status and Prospects of Engineers." He said the scientific progress of the profession has been gradual and ceaseless, yet the ancients executed works of greater magnitude than those undertaken at the present day, and among other works, instanced Lake Moerio, an irrigation reservoir, 150 square miles in extent, and the pyramids of Gizeh, constructed 5,000 years back, likewise the causeways seen by Herodotus. He reminded his hearers that Tubal Cain was a worker in metals, and, with a view of showing the ancient lineage of the profession, said that George Smith had ascertained by a tablet that the title, "master of works," existed in Assyria 700 B.C., and that the remains of works are to be found in Egypt, India, China, and all over the world, clearly denoting that the ancients possessed men answering to the description, and filling the position which the engineer of the present day occupies. Among the ancient titles there were those of the "Lord of Canals" and the "Establisher of Irrigation Works." At the present time the British Government does not recognise the leaders of the profession, and does not see fit to give them a fair field and no favour for the employment of their abilities in a country like India. As regards the prospects of the profession, the lecturer said the remuneration while in the rank and file of the profession only amounted to a few guineas a week, and that a man was not likely to make more than 700*l.* or 800*l.* per annum during any portion of his career if content to work under others. There were many appointments exceeding 1,000*l.*, and a few even reaching 5,000*l.* per annum. Although the works of the ancients were vast, they by no means exhibited skill equal to that existing at the present day,—the works of the Suez Canal and Mont Cenis Tunnel, for example, where Nature's barriers to national intercommunication had been removed by the skill of men now living. The blowing up of the mass of rocks in the "Hell Gate," the deepening of the Mississippi mouth; the construction of the East River Bridge, New York; and, lastly, in our own country, the Metropolitan Railway, are all instances of the scientific progress of our profession, and will long remain as monuments to immortalise such names as Lesseps, Sommeiller, Grattoni, Eads, and Fowler. In conclusion, he thanked the members for the kind assistance and co-operation they had at all times afforded him in his endeavours to advance the interests of the Society, and remarked he was about to face the difficulties in the way of establishing a private practice already alluded to, and looked forward to the time when this Society would become one of the standing institutions of the West of England. He hoped that each member would do all that in him lay to achieve this result, ever bearing in mind,—

> "There is a tide in the affairs of men,
> Which, taken at the flood, leads on to fortune."

The Iron Trade.—Belgian iron, for girders and supports is, says the *Sheffield Telegraph*, being delivered in Sheffield at 10*l.* per ton, whereas the cost of English iron for the same purpose is 18*l.* per ton. The same paper believes the Midland Railway Company are about to carry on the manufacture of rails on their own account, and that they have become the purchasers of Messrs. Thorneycroft & Co.'s rolling works at Wolverhampton, at a sum of 45,000*l.*, a very great bargain. It is said that 20 per cent. deposit on the purchase-money has already been paid.

NEW PUBLIC HALL AND MARKET HOUSE, BUILTH.

New buildings, intended to supply the want of proper market accommodation in Builth, have lately been erected by a limited liability company. The site chosen was at the town end of the bridge, and in addition to the market-hall proposed, it was decided to erect a public hall, with shops, offices, &c. The peculiar formation of the site, which is on sidling ground, sloping towards the Wye, led to some ingenuity in the arrangement of the plans. The basement story, which is on the high-water level, is approached from the front street, through an archway, by a broad flight of steps, on the right and left of which are a fishmonger's and a butcher's shop, whence you descend into the market-house, which is 63 ft. long by 33 ft. wide, with a triple span roof constructed of iron and glass. The market is lighted and ventilated, and has a side entrance for the supply of goods by trucks, &c. Around this market-house are nine compact and conveniently-arranged lock-up stalls, adapted for greengrocery, bacon and cheese factors, china and small-ware vendors. The market-house is lighted by gas with star-lights. The remaining portion of this basement story is occupied by store cellars and the usual conveniences, the whole of which are let out to separate tenants. The ground-floor story consists of four shops on the principal front, with plate-glass windows, and a small sitting-room in the rear of each; whilst on the Station-road front is a wine-merchant's office and shoemaker's and outfitter's shops, of special adaptation. At the left angle, being the intersection of the principal street and the Station-road, is a massive entrance, with double doors, which lead to a spacious, broad staircase, continued up to the large public hall over the whole. On the first-floor level, and on the opposite end, is a private entrance and staircase, with ante-rooms and all the requisite conveniences for the comfort of performers, speakers, &c. On the floor-level is the large public hall, 70 ft. long and 30 ft. wide, with ante or cloak room on the landing at the entrance end, and a spacious elevated platform or orchestra at the opposite end, to which are attached two small retiring-rooms. Over the entrance end is a spacious gallery. Accommodation is afforded for 400 persons on the floor-level and 100 in the gallery, making a total of 500. This hall is 28 ft. high, and has a wagon-shaped roof, with curved rib principals. The general construction is bold and massive, the façade being executed in local stone masonry, with freestone dressings. The roofs are covered with Brossley tiles. At the apex, and in the centre of the whole, is a clock-tower. The works were commenced in October last year, and have been carried out by the contractors, Messrs. D. J. & D. Davies, of Cardiff, builders, at a cost of less than 3,500*l.*, from the designs and under the direction of Messrs. Haddon, Brothers, Hereford, architects, whose designs were selected in competition.

THE CAPITAL OF THE METROPOLITAN WATER COMPANIES.

The Parliamentary powers for which the Metropolitan Board of Works have resolved to apply for compulsorily purchasing the several water companies invest the capital of the various companies with a special amount of interest at the present moment. The aggregate capital which the companies are authorised to raise under their present powers amounts to 12,935,960*l.*, of which 11,518,975*l.* are already paid up. The New River Company stands at the head of the list as regards the amount of capital which it has powers to raise. This amount is 2,792,200*l.*, and the New River differs from the rest of the companies, as the whole of this sum has now been paid up, whereas as regards the seven other companies, considerable calls have yet to be made. The next in order to the New River as to the amount of authorised capital, is the East London Company, whose total capital is 2,020,000*l.*, of which 1,875,560*l.* are paid up. Then follows the Southwark and Vauxhall, authorised capital 2,000,000*l.*, paid up 1,789,480*l.*; next comes the Lambeth Company, authorised capital 1,498,000*l.*, paid up 1,256,796*l.*; the Grand Junction Company, authorised capital 1,250,000*l.*, paid up 1,210,115*l.*; the Chelsea Company, authorised capital 1,268,750*l.*, paid up 1,054,300*l.*; the West Middlesex Company, authorised capital 1,355,066*l.*, paid up 933,183*l.*; and lastly the Kent Company, authorised capital 750,000*l.*, paid up 607,340*l.* It will thus be seen that the aggregate amount of capital yet remaining to be paid up by the seven companies who have yet calls to make is 1,416,985*l.* Up to the present time the West Middlesex Company has only paid up about two-thirds of its authorised capital, whilst on the other hand the whole of the Grand Junction Company's authorised capital has been paid up with the exception of about 40,000*l.* As regards the remaining five companies an average of from fifteen to twenty per cent. of capital has yet to be called up.

RAILWAY ITEMS.

The Tay Bridge Station.—The *Dundee Courier* gives a description of the new railway-station which is now in course of construction to accommodate the large accession of traffic which will be brought into Dundee by the opening of the Tay Bridge. The Tay Bridge Station, which is situated on the easternmost part of the ground reclaimed from the river by the Esplanade, and just immediately to the west of South Union-street, from which it will have access, covers in all about 20 acres. The passenger-station is a low-level one, and is in the north part of the ground, while the depôt for the goods has been erected on the level ground some distance to the south. The station is 1,100 ft. in length, about 100 ft. in breadth from wall to wall, and 14 ft. 6 in. below the level of the ground. The platform on the north side is of the same length as the station itself, while on the south side it is 900 ft. in length. At the west end of the building is a dock, 400 ft. long, from which all local trains,—those going to Newport, St. Andrew's, &c.,—will start. Both platforms have a width of 25 ft., but the platforms running parallel with the dock are 35 ft. wide. The station buildings, which are between the two sets of lines, and to the east of the dock for local trains, are built of brick, faced with stone, and are two stories in height. They are 350 ft. in length, 30 ft. in height, and have a uniform width of 27 ft. On the ground-floor at the east end are an office for the station-master and a telegraph office, the latter being on the south and the former on the north. To the west of these is a large left-luggage room, 45 ft. by 26 ft., and provided with lifts. Then there is a first-class refreshment-room, and at the end of it another refreshment-room for second and third class passengers. A gentlemen's first-class waiting-room is then provided, and to the west of it are waiting-rooms for first-class, second-class, and third-class lady passengers, with lavatory intervening, each of the three waiting-rooms being 26 ft. by 18 ft. At the extreme west end of the buildings are a lamp-room, hot-water-room, porter's room, and water-closets. On the upper floor, at the east end, are the ticket offices and two large parcel offices provided with lifts. Over the left-luggage rooms is a spacious dining-room. The main entrance to the station, which is approached from South Union-street by a new street 40 ft. in width, is 40 ft. wide, and the roof is about 12 ft. in height. In the station buildings, at the north end of this entrance, are two hydraulic lifts, each capable of raising five tons. The roof over the platform and rails consists of iron framework and glass, which, with the roof of the goods-shed, will be glazed according to Rendle's system. The goods station, which is wholly built of brick, is 400 ft. long, 150 ft. wide, and about 40 ft. high. Three roofs will be required to span it, and these will be constructed of iron and glass. In it there will be no fewer than five separate lines of rails, all leading to the level of the railway in the esplanade ground, and it will be provided with two platforms, one for arrival and the other for despatch. The means of ingress and egress will be ample. The works are in a forward state, and it is expected that the whole will be finished in the beginning of next year. Mr. Waddell, contractor, has had the construction of the buildings in connexion with the station; while Messrs. Wright, Young, & Co., of Edinburgh, have had the ironwork to execute. The station has been constructed according to a plan drawn by Mr. Booch, the engineer to the North British Railway Company, and the design has been carried out under the superintendence of Mr. Paterson, C.E.

The Great Northern Company's New Line at Ilkeston.—A Derbyshire paper reports that much delay has been caused in the construction of the Great Northern Railway Company's new line from Ilkeston to Nottingham, by the giving way

of two small iron bridges at Ilkeston. The ground underneath the bridges is undermined by colliery operations, and had given way to such an extent as to cause them to subside. They are being reconstructed. Adjacent to them is a wrought-iron viaduct, 42 ft. high, consisting of nineteen large spans. It carries the line across the River Erewash, which is narrow at the place, as well as the lower part of the Erewash Valley, and the line of the Erewash Valley Railway of the Midland Company. Two lines of permanent rails have been laid down for a considerable distance, in the direction of Answorth Junction, which is in the county of Nottingham, and a mile from Ilkeston. At this junction the line joins that of the Nottingham and Erewash Valley of the Great Northern Company, which was opened about a year ago. The distance from Ilkeston to Nottingham will be about fourteen miles, although it is only eight by the highway. The works in connexion with the station at Ilkeston are in a forward condition. The waiting-rooms are on the opposite side of the line, across which a bridge has been erected for the use of passengers. It is stated that the company intend to open the line from Ilkeston to Derby in January for mineral traffic, but the other portion of the line will not be opened till some months later.

THE LAW OF LANDLORD AND TENANT ON HOUSE-FITTINGS.

AT the Lambeth County-court last week, Mr Goodwin brought an action against Mr. Lucas, his former landlord, to recover 2*l.* 10*s.*, the value of gas-fittings and general house fixtures. The plaintiff stated that last year he occupied a house belonging to the defendant. When he left the house he left behind him a quantity of fittings to the amount claimed, on the understanding that he should receive satisfaction from the next tenant for the value of the fittings in question. The fittings had been detained by the defendant, but he (plaintiff) had received nothing in respect of them.

The defendant denied that he made any such arrangement with the plaintiff as had been stated, and said that he himself had received no satisfaction from the next tenant for the fittings.

The Judge said that if the plaintiff left fittings in a house without making a special bargain with his landlord as to their disposal, they became the property of the landlord on the expiration of the term. In this case it did not appear that any bargain had been made, and, under the circumstances, judgment would be for the defendant.

BREACH OF CONTRACT.

COULSON AND ANOTHER *v.* LE SOCIETÉ ANONYME DE CONSTRUCTION ET DES ATELIERS, &C.

THIS was an action (Queen's Bench) against the defendants, ironfounders and manufacturers, carrying on business at Brussels, and trading with London, Birmingham, and Sheffield, to recover damages for a breach of contract in reference to a large number of iron girders which they had undertaken to manufacture for the plaintiffs, in accordance with a fixed measurement and specifications as to depth, &c., but which, when delivered, were found to be short of the required measurement, for an extensive building, and therefore useless for the object.

The case occupied a considerable portion of the day, and resulted in a verdict for the plaintiffs, with damages.

The Lord Chief Justice said the defence was a most ungracious one, seeing that the girders were not only unfit for the building for which the specifications were given, but for any other building, unless it was constructed for them.

Mr. Wills, Q.C., asked for execution.

The Lord Chief Justice.—Yes; and the speediest that can possibly be.

AMBER ORNAMENTS AND FIGURES.

THESE may be readily made by dissolving amber in chloroform of a proper consistence, and pouring the solution into suitable moulds, allowing the chloroform to evaporate.

The medical properties of amber deserve to be more generally known. If one or two large beads be strung on a silk cord (or twine) and worn round the neck, "next the skin," it heats the body, procures a gentle perspiration, cures rheumatism, palsy, paralysis, tic doloreux, cramp, and debility, and helps the walking powers when lost. JAMES BRUCE.

*** Has our correspondent proved all this?

WITHHOLDING THE FUNDS OF A TRADE UNION.

THE OPERATIVE BRICKLAYERS' SOCIETY.

AT the Lambeth Police-court, on the 8th inst., Alfred Sorrell, treasurer of the Shoreditch branch of the Operative Bricklayers' Society, whose offices are at 5, Hatfield-street, Blackfriars-road, a duly registered society under the Trade Unions Act of 1871, was summoned before Mr. Benson, by Edwin Coulson, general secretary, for withholding the sum of 10*l.* 4*s.*, the moneys of the society.

Mr. Coulson said that defendant had been treasurer of the Shoreditch branch for some years, and it was his duty, according to the 22nd rule of the society, to pay all moneys he received from his branch to the banking stewards. Witness received information that something was wrong with his accounts, and special auditors were appointed to go through the books, when it was found that he withheld 10*l.* 4*s.* The matter was placed before the executive council, and the defendant attended, and when asked for the money he said he had not got it, and he was given a week to pay it. He, however, had not accounted for it, hence the present proceedings.

In cross-examination by Mr. Washington, witness said that the defendant's lodge had given him twelve months to pay it, but they had not the power to do so, as the money belonged to the whole society.

Mr. Washington, on behalf of the defendant, said he was instructed to say that he had been robbed of the money and 4*l.* in addition. He had the money to pay Mrs. Scott, a widow of one of the members, and deposited it with other money in a box in his bedroom, and one day when they were absent some thief entered the house and stole the money.

Joseph Derry, secretary of the Shoreditch Branch, was called by Mr. Washington, and said that the defendant told the lodge these circumstances, and they passed a resolution giving him twelve months to pay the 10*l.* 4*s.*

Mr. Benson told the defendant that he was liable to a penalty of 20*l.*, but as the society wished to deal mercifully with him, he should merely order him to pay the 10*l.* 4*s.* and 2*s.* costs, and in default of distress he would be imprisoned for six weeks.

ABERYSTWITH.

PUBLIC baths, upon a large scale, are about to be established at this popular seaside resort. The buildings will comprise a gentlemen's swimming-bath, with open-timbered roof, and a gallery round, so as to render the hall suitable for aquatic contests and public entertainments; also a similar bath for ladies, and a number of private baths. Turkish baths will also be provided. It is proposed, in addition, to erect a public library and reading-room, also several shops and a refreshment-room, and to lay out the surplus land as a recreation-ground.

The scheme has been promoted by the townspeople, with a view to supplying a long-felt public want, and in order to render Aberystwith a winter resort for visitors and invalids. The works are to be commenced in January next. The architects are Messrs. Wilson, Son, & Aldwinckle, of London.

DRAWING COPIES.

SIR,—You have no doubt noticed with pleasure the great improvement recently made in all educational class-books and school appliances. Publishers finding an enormous and increasing demand, employ first-rate literary and artistic ability, carefully supervise and arrange, and thus produce class-books which are a national credit. This excellence is seen nearly everywhere but in the Drawing Copies. There it is conspicuous by its absence. In common with most other teachers of drawing, I have been inundated lately with "specimen copies" of drawing-books for children, and I think I shall be supported by nearly all the profession when I say that most of them are simply vile. They are said to be designed (!) by men whose names are wholly unknown, and they consist mostly of unmeaning fragments cut out of South Kensington and other books of "examples," and stuck together without any regard to common-sense or congruity, much less beauty. It is impossible to describe the poverty and absurdity of these things. I send you a few specimens. In one you will see a piece of flat ornament stuck on to the round body of a vase, and both badly copied from former publications. Unfortunately, South Kensington does not help much in this matter, for, so far as I know, the list of "Examples suitable for an Elementary School," has not been altered for ten or fifteen years.

The worst of all this is that these worthless examples are largely used; drawing is now taught in most of our elementary schools, and these things are continually being copied by thousands of children. If nobody cares this will continue to go on, but if you give the powerful aid of your criticism, the educational publishers may be induced to pay as much attention to their "Drawing Copies" as they do to other class-books, and by having them carefully supervised by some competent persons, they may produce something more worthy of themselves and of the times. C. M.

SHAMS AGAIN.

SIR,—It is really surprising that public men should still deem themselves qualified to discuss, off-hand, questions appertaining to the fine arts, questions which are, perhaps, the most difficult of all questions, and questions, indeed, which can only be successfully treated by professional men who have taken the pains to examine them all round,—from every point of view. Public men would not presume to invade the province of the duly-qualified teacher in any other profession, nor do I believe they would make the fine arts an exception in this respect, if they could only be brought to understand the mischief they are unwittingly doing by promulgating erroneous views.

Art is in thrall in this country entirely from want of profound and thorough teaching,—of a right intellectual leading. And there will be no progress till the principles of art have a sounder and clearer exposition than they have at present.

Now, sir, I find that Mr. Secretary Cross, in his address to the students of the Metropolitan Drawing Classes, ran head-on to that dangerous rock of error which is so often mistaken for truth in the sea of art discussion. Mr. Cross became a total wreck in his art-teaching on the evil of outward seemings, or "shams," upon stuccoed bricks, and upon graining, &c. Why, sir, painting itself would fall under the anathema of "shams," for what is it but paint upon canvas *shamming* life? What is acting, but either Mr. Kemble shamming *Brutus*, or Mr. Kean *Richard the Third*? What is the human form but a sham of skin over revolting muscle and bone? or, what the outward face of nature but a superficial screen over unsightly clay? Beauty and art are but outward shows, at their best, of an inward and spiritual grace, and, therefore, more valuable as symbols of intellectual power than the material itself, whatever that may be, even gold itself. The true teaching is that the beautiful should be admired in this symbolical aspect in whatever material it may be presented, and for the humble it must needs be presented in something less costly than gold, silver, marble, and real woods. The skill exhibited in a really clever piece of graining is only something less than that exhibited in a picture; it is a difference in degree, and not of kind; they are both surface shows and shams. The execution of a clever piece of graining requires much more skill than the mere French polishing of a real piece of wood. Believe me, Mr. Editor, it will be well for the fine arts, and well for truth, when people shall prefer a piece of gilt pinchbeck because it is beautiful to either gold or jewels.

W. CAVE THOMAS.

WIDCOMBE BRIDGE.

SIR,—Our attention has been called to a paragraph in your impression of the 24th ult., having reference to the above bridge at Bath.

The timber structure which your correspondent has taken for a wooden bridge is simply staging for the erection of an iron foot-bridge, which we are now constructing, and which we hope to have ready for traffic by the middle of January next.

It is 96 ft. span and 7 ft. 2 in. clear width between the flanges, the main girders being 8 ft. deep. They are of the lattice kind, with vertical angle-iron stiffeners spaced 5 ft. apart. The footway, which will be of 3 in. planking, is carried in angle-iron bearers, which are connected to the vertical stiffeners about the neutral axis of the girder, thus giving a height of parapet of about 4 ft. Such is a brief description of the bridge, and which we trust you will insert in your next impression.

WESTWOOD, BAILLIE, & Co.

Sale of New River Shares.—At the Auction Mart, on the 13th inst., Messrs Edwin Fox & Bousfield held a sale of one-fifth part of a king's share, and eighteen 100*l.* new shares, fully paid. The attendance of buyers was large, and the competition brisk, the prices received being at the rate of 96,200*l.* for the king's share, and 310*l.* 11*s.* 1*d.* each for the new shares.

"THE DRAWING-ROOM."

Sir,—Will you grant me space for a few words in answer to your adverse review,—fair enough from your standpoint,—of my little book, "The Drawing-room"?

My plea to be permitted a reply is founded on inaccuracy of quotation. You attribute to me the use of the words, "wholesome china"; whereas I say "pottery," in reference to fireplaces; and the previous context shows that I allude to the glazed tiles, which allow of the hearth being washed: hence wholesome.

Again, my assertion that a material should not pretend to be that which it is not, is given as a general principle *with exceptions*, these being intended to meet the very thing you quote against me.

The charge of speaking too seriously about trifles I would meet by remarking that if a minor effect is to be produced, a major must be attempted; and we have the authority of Michelangelo against disdain for trifles.

I venture to think that no better defence of the school in which I believe can be found than in the obvious fact that, with the help of fashion, it has subdued the vulgarity of the recent past in decorative art.

Lucy Orrinsmith.

UNOBSTRUCTIVE BEDDING.

Sir,—Much having been done to improve the dwellings of the working classes, more especially in their economical construction and arrangement, I would suggest an improvement in the furnishing which would add largely to the comfort of thousands.

I strongly advocate, from a sanitary point of view, the use of hammocks, for at least the whole of the younger members of the household, in place of the cumbersome bedsteads, mattresses, &c., and I think that were the landlords to supply the necessary attachments as fixtures, hammocks would come largely into use, were it only from their comfort.

The requisite fixings for each hammock are simply two rings firmly fixed to the walls on opposite sides of the room, if a small one; but if the room be over, say, 9 ft. wide, one or both may be a flush ring in the floor; this latter plan necessitates a pair of light legs to support the hammock, which requires no skill in fixing, and may be accomplished in two minutes.

During the day the whole of the hammocks would be struck, and thus leave the room clear as a sitting-room, without any appearance of its being used as a dormitory at night.

Workmen, also, going out to work would find it much to their advantage to take their hammock and blanket with them, rather than, under the present system, have to put up with the roughest and not the cleanest accommodation.

The cost of a full-sized hammock, with a blanket, ought not to exceed 10*s*.

M. I. M. E.

"WORM-EATEN CARVINGS."

If "S. F. C." will carefully observe the beech carvings in the months of July and August he will probably find the enemy in the form of small brown beetles on the surface. I have watched them coming out of the minute holes in so-called "worm-eaten" furniture and floors and swept them up in a dust-pan.

In an old house where they literally swarmed, by keeping vigilant watch for two or three summers I could not collect a dozen where formerly I got hundreds; and I cannot but think that the only effectual way of getting rid of the pest is to seize the opportunity which they afford every season of "catching-'em-alive, oh!"

J. H. S.

Sir,—In reply to your correspondent, "S. F. C.," I believe the only remedy to stop ravages of worm in wood is turpentine. Let delicate carvings be saturated, no harm is done, and any living worm is destroyed. For this purpose I have used large quantities of turpentine.

K. K.

RUNAWAY HORSES.

Sir,—I read in the *Builder* of the 8th inst. the fatal accident to Mr. Lowe by runaway horses. There have been of many these accidents of late. I witnessed one where horse, cab, and lamp-post were smashed. All wheels could be scotched and skidded the moment the driver left or was thrown off his seat; or, if he retained the reins, he would have to rise from his seat, and instantly the wheels would be locked. I have noticed some fine wide openings without guard-posts, apparently left thus till some frightful accident occurs: two on Westminster Bridge; several with a decline from the Strand terminate with steps on to the Victoria Embankment; there is also a short cut into St. James's Park down the Duke of York steps. Blackfriars is the only bridge with lamp-posts on the footway to protect pedestrians from being crushed. We only want a Bishop or a Prime Minister knocked down, then there would be a committee of inquiry.

R. T.

MASTERS AND MEN.

Manchester.—The Manchester master builders held the annual meeting of their association on the 14th inst. The number of non-union joiners employed in that city and neighbourhood was reported greater than had been since the strike began. Owing to the slack season many of the masters have been able to discharge inferior hands and replace them by better workmen. The success of the masters in securing non-union workmen was regarded very satisfactorily, and a general determination was unanimously express to retain the non-union men, and to increase their numbers when fresh men are required.

London.—On the 13th inst. a crowded meeting of operative stonemasons was held in the Cambridge Hall, Newman-street, to discuss the position of affairs with regard to the strike, now in its twentieth week. The chair was taken by Mr. H. Broadhurst, who said (we quote from the *Daily News'* report), he had had a long discussion with Mr. Stanley Bird, and spoke of the introduction of foreign labour, &c., but he was sorry to say that the impression left on his mind by this conversation was that there was no possible solution of the question but to continue the course they were pursuing. He much regretted that a disposition existed among some of the employers to continue the struggle till one side or the other were compelled, by sheer necessity, to bring it to a close. He, however, should never suggest the closing of the dispute until they were absolutely beaten, or until he could propose such suggestions as they would find worthy of acceptance. A trying time was coming, and he urged them to be firm, and to abide by the principles of law and order which they had hitherto observed. Let them not allow themselves to be persuaded to commit any offence against the law. A resolution was passed to appoint other delegates to send to the country, &c., as several of those already elected were now at work. One of the delegates, it was stated, was in Germany, and had induced ninety German masons who had been engaged to come over with the last contingent, to return to their homes instead of proceeding to London. It was fully decided to continue in the course which the committee were pursuing, and having agreed to this the meeting took up the consideration of details. Thirteen American masons arrived from New York on the 12th inst. by the steamer *Anglia*. The rapid increase in the supply of masons from both home and foreign sources is so great that many of the master-builders have all the hands they can employ. The supply from Germany has proved so satisfactory that in the case of important contracts several of the large builders have expressed their intention to avail themselves of it.

Wales.—A lock-out of about eighty slate quarrymen took place at Coed Madoc Quarry, Nantlle, on the 7th inst. It appears that some time since a workman threatened the manager, and having been convicted before a magistrate, was discharged in consequence. A deputation from the Quarrymen's Union wished for an expanation. This, Mr. Roberts, the lessee of the quarry, refused to give, not recognising the right of the Union to interfere in the management of the quarry. He also threatened to discharge the workmen who had ceased working if they did not return in a given time. Considerable excitement prevailed, and the cessation of works became general. On the following day, however, the men asked leave to return to work, which was refused.

Technical Education. — The Executive Committee of the Livery Companies of London, formed to promote the establishment of a Technical University, met last week to consider the reports which had been drawn up for their guidance. At the last meeting of the committee it had been determined to procure reports from qualified persons as to the best means of utilising the funds available in the promotion of technical education. These reports were taken into consideration by the committee, and it was decided to meet again for their further discussion.

IMPORTANT CASE UNDER THE METROPOLITAN BUILDING ACT.

WHAT IS A SEPARATE BUILDING? WHAT IS A ROOF?

In accordance with a report presented to the vestry of Camberwell by their surveyor, Mr. J. C. Reynolds, the Vestry, as stated in the *Builder* for Nov. 17 (p. 1159), lately called the attention of the Metropolitan Board to what he considered to be the defective and dangerous construction of some so-called "model" buildings for the working classes, in course of erection by Mr. Nunn, in Choumert-road, Peckham. After inquiry, the Metropolitan Board gave instructions for a summons to be issued against Mr. Nunn for what they considered to be infractions of the Act, and the case came before Mr. Lushington, at the Lambeth Police-court, on the 12th inst. The summons was taken out in the name of Mr. Henry Jarvis, district surveyor for Camberwell, who was, however, only nominally the complainant.

Mr. Biron, who appeared on behalf of the Board, stated the facts of the case, which were not disputed. It appears that in the notice to the District Surveyor of intention to proceed, Mr. Nunn referred to the buildings in question as "two dwelling-houses, about 28 ft. deep, by 120 ft. wide, by 18 ft. high, with two stories." The District Surveyor concluded that the houses were such as would fairly come under the description given of them in the notice, and the structures proceeded. Mr. Jarvis did not make any formal requisition on the builder until the houses were actually roofed in. From the street known as Albert-grove there is an approach 18 ft. 5 in. wide, running along towards the space between two blocks of houses. This approach narrows to 15 ft. 2 in. at the entrance to the block, when it widens out to 26 ft., at which point there is a passage about 3 ft. 9 in. in width running along the block, and giving access to the several tenements. On the outer side of this passage or corridor (which is at present open to the sky, although it is intended to be glazed in), is a wall 9 ft. high, built of proper materials and dimensions for an external wall, although it was contended that it was not an external wall within the meaning of the Act. On the inner or house side of the passage is what Mr. Biron contended is really one of the external walls of the dwellings, though it was only constructed of quartering covered with lath and plaster. Through this wall or partition doors are pierced, each leading into a separate tenement, each tenement containing four rooms, two on the ground floor and two above, and each tenement having its own separate entrance and staircase. The division walls between the several tenements were of the same construction as the inner wall of the passage, the only brickwork in such walls (with the exception to be named) being that used for fireplaces and flues. The block contains about twenty separate dwelling-houses, but Mr. Nunn had caused a proper party-wall of brick to be erected in about the centre of the entire block, except that it did not cross the corridor or passage in question. This party-wall, if carried across the corridor, would admittedly divide the block into two portions, each slightly within the 3,600 ft. limit prescribed by the Act, but Mr. Biron contended that each of the several self-contained dwellings contained in each half of the block so divided came within Sub-section 3 of Section 47 of the Building Act, and was a separate dwelling-house. One great object of the Act was to diminish the risk of fire, and as each separate dwelling was a possible centre of conflagration, it was desirable that there should be a proper wall of brick or some incombustible material separating each dwelling from the one adjoining. As had been stated, what was really one of the external walls of the dwellings (supposing each tenement to be a separate house) and the party-walls were of lath and plaster, so that most of the dwellings were closed in on three sides by means of partitions constructed of combustible materials. (It should be mentioned that the back wall of the buildings is carried up through both stories of proper material and dimensions, so also are the walls at each end of the block.) Another point for the consideration of the magistrate was this: The quarter-partition on the inner or house side of the corridor referred to, and through which access was obtained to the several tenements, was carried up throughout the whole length of the block on the first floor, of practically the same construction, except that it was made to slope or batter slightly (being 3 in. or 4 in. out of the perpendicular), and was faced externally with 1 in. of Portland cement, which was applied directly on to the laths. It would be contended by the defendant that this was a roof; but Mr. Biron maintained that it was not a roof within the meaning of the Act, but an external wall.

The District Surveyor was called, and deposed to the main facts as stated above. It appeared, however, from documents put in, that he was not quite at one with the authorities at Spring Gardens as to some of the points at issue. Asked by Mr. Biron as to whether, in his opinion, the buildings infringed the provisions of the Act, exception was taken to the question, on the ground that it was a matter of fact for the magistrate to decide.

Mr. Lushington upheld the objection, which put out of court the evidence which Mr. Biron was prepared to adduce, by Mr. H. H. Collins and other district surveyors, to the effect that the buildings did contravene the Act.

Cross-examined by Mr. H. Sutton, on behalf of Mr. Nunn, the District Surveyor said that the cement with which the outer face of the alleged roof is covered is an incombustible material.

Mr. H. Sutton, for the defendant, contended that the tenements in question were not separate buildings; that the inner wall of the corridor was not an external wall within the meaning of the Act; and that the superstructure of this wall was a roof.

The Magistrate, in giving his decision on Wednesday last, adopted this view of the case, and dismissed the summons, with 2*l*. 2*s*. costs against the Board.

Proposed New Building Bill.—Any comments at present on the proposed new Bill must be premature. The draft, as revised, is still before Counsel unsettled.

ARCHITECTURE AT THE ROYAL ACADEMY.

PROFESSOR EDWARD M. BARRY, R.A., is about to commence his course of lectures. The following is the programme:—Thursday, Jan. 31, Position of Modern Architects in respect of Architectural Restoration; Feb. 7, Early Military Architecture; Feb. 14, Fifteenth-century Architecture; Feb. 21, Transitional or Elizabethan Architecture; Feb. 28, Italian Renaissance; and March 7, English Renaissance.

We are glad to say that the authorities of the Royal Academy are willing to admit students of those societies, or from private offices, to attend the lectures as far as space may permit. Applications for tickets by such persons, or by others interested in the subject, are to be made to the Professor of Architecture at the Royal Academy, Burlington House, or at 21, Abingdon-street.

ASSISTANT ARCHITECTS' AND DRAUGHTSMEN'S BENEVOLENT SOCIETY.

SIR,—In a presidential address, delivered by me to the Architectural Association five years ago, I took the opportunity of advocating the formation of a society simi'ar to that suggested by your correspondent "Bienfaisance." The matter was not taken up at the time, but if the idea of your correspondents is general amongst architects' assistants and clerks, I shall be happy to do anything in my power to promote such an institution.

With a view to put the matter in a tangible form, I shall be glad to receive the names of those interested in the movement addressed to me at the rooms of the Architectural Association, 9, Conduit-street, W., and if there is sufficient response I will endeavour to arrange for a meeting at an early period to discuss the subject.

J. DOUGLASS MATHEWS.

MANAGEMENT OF COMPETITIONS.

SIR,—So much has already been written upon this subject, both by yourself and your correspondents, that it has become stale and unpalatable, and consequently fails to excite that interest amongst the members of the architectural profession which it imperatively calls for, seeing that it has already become the medium which will tend in the immediate future, if it has not already done so, to rob them of their dignity, and render them little short of ridiculous in the eyes of the British public.

There will be little cause for wonder if architects come into disrepute after we have had a few more disclosures similar to that made in the *Builder* of December 8th, in connexion with the Maidenhead Hospital Competition. Here we have an example of lamentable degeneracy, and a sad lack of *esprit de corps*. It is a sorry sight,—a most pitiful spectacle,—to see the members of a learned profession so frequently made the mere tools and playthings of nameless and, in the majority of cases, illiterate tradesmen.

Cannot architects adopt some method of procedure that shall render competition honourable and a thing to be desired rather than otherwise? The gratuitous system at present in vogue must be discarded, and a fair and proportionate remuneration paid to each competitor.

Architects have but to refuse to compete unless called upon to do so, and even then only when their expenses are guaranteed.

Instead of issuing an alluring and fascinating advertisement, local boards, governing bodies, and committees should select a number of architects and request them to compete, and allow each competitor reasonable compensation for the outlay of time, money, and experience required of them.

Architects have the solution of this problem in their own hands, and have but to refuse, as a body, to compete under any other condition when the disgraceful proceedings at present invariably connected with competitions would cease to be regarded as matters of every-day occurrence.

As already pointed out in the *Builder*, exception to the above regulations might be made in the case of strictly national works.

The baneful results of competition as at present carried out have been frequently pointed out in your journal, and I fear that nothing satisfactory will result from the constant revival of old grievances until a few architects form themselves into a society for the express purpose of discountenancing the usual method of competition. What cannot be done by compulsion within the walls of the Institute may be accomplished by moral suasion from without.

J. G. B.

NEW TOWN HALL, BARROW-IN-FURNESS.

AT a meeting of the New Town Hall Committee, held in the Municipal offices, Barrow-in-Furness, on the 15th of December, 1877, Mr. A. Waterhouse's report on the designs submitted was read, in which he stated that he had come to the conclusion that the first place in the competition should be awarded to "Ima" (150*l.*); second place to "Fortis" (100*l.*); third place to "Rathaus" (50*l.*).

The report having been adopted, the committee proceeded to open the various letters containing the names and addresses of the authors of the designs, by which it appeared that the architect for the designs "Ima" had omitted to inclose his card; "Fortis" was Mr. T. E. Collcutt, 26, Bloomsbury-square. "Rathaus," Mr. H. Perkins and Mr. G. B. Bulmer, Park-row, Leeds.

THE MASONS' STRIKE.

SIR,—A great deal has been written lately in reference to the masons' strike. Another contributor appeared last week in the *Builder* signing himself a "Building Artisan," who has gone into many questions that he evidently knows little about, and has dealt very liberally in assertions in reference to the officials connected with the strike, which have no foundation apart from his imaginative brain. If the principle of free trade, as explained by a "Building Artisan," is simply to compel workmen to accept just as much or little as it may be the pleasure of the employers to pay him,—to say the least of it, it is a rather one-sided science. It must be patent to every impartial mind that without organisation a workman who exists only upon the product of his labour is by force of circumstances entirely in the hands of the capitalists, and we know from experience that employers are too willing to avail themselves of any weakness on the part of the men; but should they combine to place themselves in a position somewhat approximate in power to that of the employers, the attention of the public is at once drawn to the tyranny of trade unions, as though the organisation was something apart from the members. It does not seem to occur to the mind of your correspondent that a trade union is a combination of men, formed by themselves, governed by themselves, through officers over whom they have unlimited control.

"A Building Artisan" infers that it is to the interest of every one, save the "foremost in this strike," that it should be settled as early as possible. If he had watched the course of events since the commencement of the strike he would have seen that those to whom he refers have continually been doing their utmost up to the present time to bring about a settlement. I might also inform your correspondent that every member of this committee was at work at his trade up to the day of the strike, and will return to it again as soon as the strike terminates. Your correspondent observes in one part of his very long letter, in referring to the subscriptions of our members, that "It will be said these subscriptions go to the support of the sick and burial fund, &c. True that is one of the objects, which is deserving all due honour, but is it not patent to those who know anything about these matters that the benefit society is but secondary in consideration, the primary object being the maintenance of the strike fund?" If he is one of those who knows anything about it he must know that his statement is not correct, because there is no society that spends anything like the amount of money in trade disputes as in administering benefits; this society, perhaps, spends as much in trade disputes in proportion to its numbers as any society, and the difference between the two items in our accounts is no less than 162,000*l.*, we having spent for trade purposes the sum of 80,000*l.*, and for benevolent purposes no less than 242,000*l.*

"A Building Artisan" has fallen into the same error (if error it is) as many other correspondents in your and other publications, which, considering his signature, is, to say the least, somewhat strange; that is, that we demand the same rate of pay for all, and limit the amount of work executed by some. Such is not the case, and every one connected with the building trades must be well aware of it: with very few exceptions there were but few shops previously to the strike that had not men working for less than the current rate. At the Law Courts, for instance, which was one of the strongest society shops in London, there were many working under the established rate, and no exception was taken to them by our members, because it was known that they were receiving quite as much as they were worth. There is also a system in some firms of booking all work done each day by the men in their employ, and perhaps the most complete system was adopted at the Law Courts, and I am confident that if they could be examined, they would be found to substantiate my assertion, that the society does not limit the amount of work done by its members. All that we require is a standard rate of wages; that is all we ever had or required. Your correspondent asserts, "advisedly and emphatically," that an Englishman's labour is his freehold property, and that he can dispose of it upon any terms that may suit his convenience, and no man or any number of men has any right to interfere in any way, or dictate the terms. I would like to ask him, if trade unions were abolished, how long would the workman be in a position to have a voice in the disposal of his labour? It would be, "Work on our terms or starve." Working men know this, and the day is far distant when the sophistry of a "Building Artisan," or any one else, will have the power to induce working men to turn their backs upon that which has done them much good in the past, and obtained for them so many advantages that would never have been conceded by the employers unless the pressure of an organisation had been brought to bear upon them.

H. NISBET,
Corresponding Secretary, Central Strike Committee.

CHURCH-BUILDING NEWS.

Shoreditch.—On the 18th ult., special services were held in Shoreditch Church, following the repair and cleansing of it. The edifice is one of the five erected close on a century and a half ago, known as Queen Anne's churches, and had Hawksmoor for its architect.

Prestbury.—It has been resolved to restore Prestbury parish church, under the direction of Sir George Gilbert Scott, R.A.

Perry Barr.—Christ Church, Perry Barr, Birmingham, was opened on the 15th ult., after improvement and enlargement to the extent of 300 sittings. The school-rooms have also been enlarged, and the improvements, which have been carried out by Messrs. Rowley & Lynex from a design by Mr. Chatwin, architect, have entailed an expenditure of about 500*l.*

Knighton.—The Parish Church of St. Edward, Knighton, near Ludlow, was re-opened on the 16th ult. by the Bishop of Hereford. The work of restoration commenced in the month of April, 1876, the architect being Mr. Pountney Smith, and the builder Mr. Williams. The cost has been 2,414*l.* 3*s.* 2*d.*, in addition to 318*l.* 14*s.* for the tower and chapel.

Oakamoor.—Oakamoor Church, near Uttoxeter, was re-opened on the 10th ult., after restoration. A new stone vestry has been erected, and the interior of the church has been decorated. The works have been executed under the superintendence of Mr. Peter Ford, builder, Uttoxeter.

Everton.—The new church of St. Cuthbert, in Robson-street, Everton, near Liverpool, has been consecrated by the Bishop of Chester. The permanent edifice thus dedicated supersedes the use of a temporary iron church. The site was given by the Marquis of Salisbury, and the work has been carried out by Mr. J. H. Mullin, Walton-road, from the designs by Messrs. T. D. Barry & Son, architects, Liverpool. Sittings are provided for 750 persons. The church is Early Decorated in style, the materials used being the local red sandstone, lined internally with brick, and plastered, and faced externally with Burnley parpoints. The plan includes a nave 97 ft. in length by 24 ft. 7 in. wide; chancel, 25 ft. long and 22 ft. 7 in. wide; and north and south aisles, 83 ft. long and 13 ft. 8 in. wide. On the south side of the chancel are an organ-chamber and choir vestry, the ministers' vestry being on the opposite side. The chancel contains stalls for the choir and clergy, and the church is furnished

throughout with open benches. A tower 18 ft. square, with spire, rises from the south-west angle, and the entrances are at the western angles. The site being in a sloping situation, advantage has been taken to provide underneath the church a Sunday school, for the reception of 300 children. The total cost has been upwards of 8,000*l*.

Dundee.—The Steeple Church, Dundee, was re-opened on the 25th ult., after renovation and re-decoration. The whole of the plaster ceiling has been renewed by Mr. A. S. Drummond, who has also painted the walls and the roof. The ceiling has been divided into panels painted pale blue, styles buff, while the enriched cornice has undergone a thorough cleaning, and has been done in oil. The walls have been coloured a pale green, and have been divided by shafts with stencilled ornaments. The ceiling has been painted according to a design of Mr. Wm. Alexander, the town's architect. The whole of the roof has been re-slated by Mr. Andrew Buttar, while the joinery work and upholstery work have been executed by Mr. William Young and Mrs. Buist respectively.

Collingbourne Ducis.—The parish church of Collingbourne Ducis, Wiltshire, was re opened on the 20th ult., after restoration. The church, which is dedicated to St. Andrew, is of the Late Norman period, with aisles and chancel of later date, and a Perpendicular tower. The arches of the nave are of the transitional period between Norman and Early English, as in many other Wiltshire churches. The chancel was rebuilt in 1856, from designs by Mr. Street, the old windows being preserved. The rest of the building being in great need of repair, and blocked up in the interior with western gallery and unsightly pews, it was resolved last year to consult Mr. Blomfield, the architect, and on receiving his report a year ago, a committee was formed for carrying out the works he recommended. The stonework of the windows, pillars, and arches has now been all carefully restored. The chancel-arch has been removed, and a new one built in its place, in character with the building. The roof has been raised to the ancient pitch, or rather above it, to agree with the chancel pitch as restored by Mr. Street, and covered with Broseley tiles. It is left open in the interior. The pulpit, designed by Mr. Blomfield, carved in oak by Mr. Earp, of Lambeth, on a stone base, is a memorial gift of the sons and daughters of the late Mr. and Mrs. Mackrell. The upper part of the tower being in sound condition, has been left untouched for the present. It has some peculiar features of interest, having been built, it is thought designedly, not at right angles to the church, but with a turn towards the south; and the walls of the central stage being constructed with internal niches, so as to form a dove-cote or pigeon-house, an entrance being left on the south side about 2 ft. square. This feature is believed to be almost unique. The works have been executed by Mr. John Wooldridge, of Hungerford. The total cost, including gifts and the value of old materials, is about 1,300*l*.

Bolton.—The corner-stone of the new Church of St. Bartholomew, Bolton, has just been laid by the Earl of Bradford. The church, which is to be erected at the junction of George-street and Nelson-street, will consist of nave 93 ft. 4 in. by 27 ft. 5 in., chancel 28 ft. by 27 ft. 5 in., south transept 31 ft. 10 in. by 26 ft., south aisle 66 ft. 6 in. by 11 ft. 11 in., north aisle 93 ft. 4 in. by 11 ft. 11 in., organ-chamber at south-east 15 ft. by 15 ft., vestry at north-east 15 ft. by 12 ft., porches at west of north aisle and in the south-east corner of transept, warming chamber under vestry, &c. The nave on the north side will be divided from the aisle by an arcade of seven lofty arches, supported on polished red granite columns, having moulded stone bases and moulded and carved capitals; this arcade will support the clearstory, which will be pierced by seven two-light tracery windows; on the south side will be a similar arcade of five arches, and a large and lofty transept arch, supported on two additional granite columns. The chancel arch will be of large proportions,—very lofty, and richly moulded,—as will also be the jambs supporting it. All the interior stonework will be of Bath stone, except the caps and bases of nave columns, which will be of Cefn stone. The walls will be built of local rubble stone, the inner lining being of brick, and the outer facing of parpoints in courses. All the stone used in the external work is to be from the Stiveton quarries. The whole building will be of the most substantial character throughout. It is not intended at present to erect the tower and spire. The style of the church is Decorated. Owing to the site being almost entirely of made-ground, a considerable expense has been incurred in the foundations, which in every case have been carried down to the hard clay, the foundations on the south and east sides being carried to a depth of 25 ft. The present contracts do not include the completion of the works, but only the items named:—Messrs. Aspinall & Rothwell, for stonework and brickwork of church, 4,660*l*.; Mr. Silas Seddon, for joiner's work in roofs and centreing, 900*l*.; Mr. Phineas Hall, for foundations, 754*l*.; Messrs. Aspinall & Rothwell, ditto, 156*l*.; total, 6,470*l*. Mr. Brearly is the clerk of works. The whole of the works are being carried out from the designs and under the direction of Messrs. T. D. Barry & Son, Liverpool.

Linslade.—The Church of St. Mary, Old Linslade, was reopened on the 29th ult. The church is an ancient structure, and consists of a tower and nave; its dimensions are small. When the London and North-Western Railway Company made their station so near to Leighton Buzzard, a new village sprang up in close proximity, and in consequence a new church, dedicated to St. Barnabas, was built there in 1849. This was found inadequate for the requirements of the growing population, and in 1868, a south aisle and tower were added, and the chancel enlarged. It was then (says the *Bedfordshire Times*) that the sweet peal of bells from the nearly disused church of St. Mary, in question,—some mile and a half from the new village,—were removed to the new tower of St. Barnabas. Stripped of its bells,—save the minute one,—and left to the mercy of the moping owls, the old edifice, which was now used as a mortuary, and for an occasional Sunday afternoon service in the summer, was falling into decay, when the Vicar, the Rev. H. A. Gibson, energetically set to work to obtain a restoration and securing the pecuniary assistance of several of the leading residents and landowners, has, after much hard work, been successful. Mr. Lawrence, the architect, has directed the progress of the work.

Popham (Hants).—A new church has lately been completed at Popham, which has been erected solely at the expense of the Right Hon. Lord Ashburton. It consists of a nave and chancel, with an apsidal termination, a vestry on the south side, west porch, and western bell-turret. The external dressings are of Tisbury stone, the plain surfaces of the walling being filled in with split flint-work, as usually found among the Norfolk churches. The style is Early Gothic, after the manner of the thirteenth century. The nave is fitted up with open benches in pitch-pine, the pulpit and reading-desk, with lectern, being in oak. The roof is open, and formed in stained deal, and the chancel roof is panelled in pitch pine, with carved bosses at the intersections of the ribs, the panels being again divided by early cusping, diagonal ribs, and carved bosses. The walls of the chancel below the cills of the windows are lined with red terra-cotta diaper tiles, consisting of four-leaved flowers. The five lancet windows of the chancel have each a single figure in stained glass, consisting of Our Saviour and the four Evangelists, executed by Messrs. Heaton, Butler, & Bayne. The builders were Messrs. Cornish & Gaymer, of North Walsham, Norfolk; and the stone-carving was by Mr. Harry Hems, of Exeter. The architect was Mr. James K. Colling, of London. The total cost was about 2,000*l*.

DISSENTING CHURCH BUILDING NEWS.

Audley.—The new Wesleyan Chapel at Audley, Staffordshire, just opened, has been erected by Mr. Charles Hayes, of Audley, at a cost of about 3,000*l*., from designs by Mr. Wm. Watson, architect, Wakefield. It is of Classic design, built of red brick, with Hollington stone dressings; is 60 ft. long, by 45 ft. wide inside, with galleries on both sides three pews deep, and at the end, vestry at the rear, and organ chamber over. Sittings are provided for 750 persons. The fittings are of pitch pine.

Southport.—A new Mission Chapel in connexion with the United Methodist Free Churches, has just been opened in Chatham-road, Birkdale. The building has been designed by Messrs. Maxwell & Tuke, architects, and consists of a large room 42 ft. by 28 ft., 20 ft. high in the centre, and 12 ft. at the sides; a minister's vestry and class-room, each 11 ft. square; and a tea-room 11 ft. by 5 ft., with store-room over. The outside walls are of common brick, with 3 in. cavity, and the front is relieved with patent brick bands and Cefn stone dressings. The dressed woodwork is of red deal, stained and varnished. The roofs are covered with blue Velcubeli slates and red ridge tiles, and overhang at eaves and gables. A vestibule 9 ft. by 4 ft. 6 in. leads into the chapel by swing doors at each side, and at this end of the room fixed benches are placed to seat 80 adults; the remainder of seats are loose forms for 120 adults. Mr. James Cheetham, builder, Southport, has carried out the work, at a cost of 710*l*.

Liverpool.—On the 30th ult. the foundation-stone of a new church and schools for the Primitive Methodist body was laid by the mayor of Liverpool (Alderman A. B. Walker), in Prince's-road, at the junction of Mulgrave-street and Beaconsfield-street, which abut on the new Boulevard near Prince's Park. The chapel will be a parallelogram in form, 75 ft. long and 46 ft. wide. The schoolroom will stand, at a right angle, at the back of the chapel. The ground-floor will contain five class-rooms, and several private rooms; and, in addition to other rooms overhead, there will be a spacious school-room, 75 ft. by 33 ft. The chapel will seat 900 people on the ground-floor and galleries. The sides of the chapel and the elevations of the schools will be carried out in brick with stone dressings, and the front of the chapel and tower in Yorkshire shoddies, with stone dressings. The tower will have an octagonal spire, 110 ft. high, of dressed stone. The architect is Mr. R. Owens, and the contract has been taken by Messrs. Nicholson & Ayre for 6,536*l*.

Irchester.—The memorial stone of a new Primitive Methodist Chapel has been laid at Irchester. It has been designed by Messrs. J. Kerridge & Sons, architects, Wisbeach, and Mr. Roberts, of Wellingborough, is the builder. The structure will be of brick, faced with white "Whitticks" and Wellingborough "pressed reds." Mr. J. West, Irchester, has accepted the contract to do the carpenter's work.

Aldbrough.—A new Wesleyan Chapel was opened at Aldbrough, near Darlington, on the 16th ult. It is an Italian building, of stone, accommodating 160 persons; the cost has been about 460*l*. The chapel was built by local contractors, from the designs and under the superintendence of Mr. Alfred J. Martin, architect, Darlington.

Whalley Range.—On the 19th ult. the foundation-stone of a new church and school, in connexion with the Presbyterian Church of England, was laid in Upper Chorlton-road, Whalley Range, by the Rev. Dr. M'Kerrow. The entire cost of the buildings is estimated at from 8,000*l*. to 10,000*l*. The building, which is being erected from the designs of Mr. H. R. Price, architect, Manchester, will be in the Early Gothic style, with a spire 127 ft. high rising from the principal entrance. The church will be 90 ft. in length, with a breadth of 45 ft., and will consist of nave, aisles, and transepts with galleries. At the back of the main building there will be a lecture-hall to accommodate 370 persons, and schools are also being built. In the church accommodation will be provided for 750 worshippers.

Sheepshed.—A new Primitive Methodist Chapel has been opened in the village of Sheepshed, Leicestershire. The building is mainly brick, and has been erected by Mr. Faulkes, of Loughborough, the woodwork being executed by Messrs. Johnson. The total cost will reach 700*l*.

Ipswich.—The foundation-stone of a new mission chapel for the Wesleyans has been laid at Ipswich. The building will be of red brick, and will seat about 170 persons; it will cost 400*l*., exclusive of site. Messrs. Smith & Welham are the builders.

Shoreham (Kent).—On the 14th ult. the memorial stones of a new Wesleyan chapel in the village of Shoreham, Kent, were laid. The building is intended to seat 200 persons, with schoolroom for 100 children. The total cost will be about 1,000*l*. Mr. Charles Bell, of London, is the architect; and Mr. John Willis, of Sevenoaks, is the builder.

Manchester.—The foundation-stone of a Wesleyan School Chapel, in Raby-street, Moss-side, was laid on the 24th ult. All internal woodwork is to be of pitch-pine, stained and varnished; the walling externally to consist of white headers, relieved by stock bricks and stonework. Haden's system of warming is adopted. The contract has been undertaken, at a cost of about 3,500*l*., by Mr. W. W. Harrison, of Greenheys, from the designs of Mr. John Lowe, architect, Manchester.

ROMAN CATHOLIC CHURCH-BUILDING NEWS.

Portsmouth.—A new Roman Catholic Cathedral is to be erected at Portsmouth. The site, situated between the Edinburgh and the Alfred roads, commencing at the fork as one passes from Portsea, and extending some 50 ft. down the Edinburgh-road, has been purchased of the Government. Plans have been received from Messrs. Hansom, Messrs. J. Hansom & Son, Mr. Wheeler, Mr. Wray, and Mr. J. Crawley, and those of the latter have been selected. The buildings have been arranged with a view of placing the church in the most prominent position, with the tower and spire forming the starting-point of the two ranges of frontages in the Edinburgh and Alfred roads. The church will have three public entrances (a western central door can also be obtained if desired),—two in Edinburgh-road and one in Alfred-road. The church will contain nave, north and south aisles, transept, chancel, two side chapels, baptistery, Calvary, organ-loft, tower and spire, and sacristies. It will afford good accommodation to from 1,000 to 1,155 persons. The church is planned with a view of showing how the whole available ground might be thrown into the church if it were required to serve as a cathedral; if, however, accommodation for 1,000 only be required, it may be advisable to omit one bay of the nave and aisles. The dimensions of the church are to be as follow:—Nave, 140 ft.; chancel, 41 ft.; total length, 181 ft. internal. The breadth will be 59 ft., the nave being 29 ft. wide. The height of the nave will be 60 ft. internal, and the height of the tower and spire 201 ft. The style adopted is Early Decorated. The schools have been arranged with a view of providing three playgrounds, for the boys, the girls, and the infants respectively. The infants' and boys' schools are placed on the ground floor, and the girls on the first floor, over the boys. The girls' and boys' schools are each 70 ft. long by 25 ft. wide, and the infant school 50 ft. by 31 ft.

Newtownards.—The new Roman Catholic Church of St. Patrick, Newtownards, has been solemnly dedicated for worship. It has been erected at the sole cost of the Dowager Marchioness of Londonderry, and occupies a hill looking over towards Scrabo, and commands a view of Strangford Lough. The style chosen is Early Gothic. The church is cruciform in plan, with nave and aisles, transepts, sanctuary, one side chapel to the north-east, and sacristy to the south-east. The nave rests upon a clearstory above the aisles, and abuts, as do the transepts and sanctuary, against a truncated tower at their intersection. The tower is surmounted by a pyramidal slated roof, and engaged at the south-east angle is a circular belfry-turret, pierced with louvre openings in its upper stage, and crowned with a pointed conical roof. The architects are Messrs. Joseph E. Hansom & Sons, London. Mr. Robert Curry, Belfast, was the builder; while Mr. Thomas Stokes acted as clerk of works. The new high altar, which is of Caen stone, relieved by Cork red and Galway green marble columns, has a reredos containing groups and statues, and, together with the statue of St. Patrick, in the west entrance, and also that of St. Joseph, placed in the interior of the church, has been executed by Messrs. Neill & Pearse, Dublin.

Rock Ferry.—The new Roman Catholic Church of St. Anne, Rock Ferry, has been opened for service. The building is Early Decorated in style, and contains nave, chancel, transepts, and side chapels, besides baptistery and tower. The materials used are yellow Stourton stone for the dressings, with facings of Welsh pierrepoints of a bluish tint. The whole of the interior of the chancel and chapels has a facing of Stourton stone. The roof of the nave is carried by five moulded principals, which are supported on stone shafts, the spaces between being divided into panels by moulded ribs of red pine. The chancel and chapels are vaulted with deep moulded ribs, and are lighted with richly-traceried wheel-windows. The whole of the interior fittings are of pitch pine. The entire length of the building is 124 ft., the outside width of nave is 49 ft., and the same, including transept, is 70 ft. The height from floor to apex of roof is 49 ft. The total cost amounts to upwards of 7,000*l.* The building was designed by the late E. Welby Pugin, and has been carried out under the direction of his brothers, Messrs. C. & P. Pugin, architects, by Mr. Woolley, of Chester. The gasfittings are by Mr. Robert Hamilton, Birkenhead.

SCHOOL BUILDING NEWS.

Bedford.—The "St. Paul Allhallow Mission School," Bedford, was opened on the 5th inst. The building is intended to supply a three-fold purpose,—first, as an infant school during the week; secondly, as a Sunday school; and, thirdly, as a mission-room for services on Sunday evenings. The building, which has been erected from plans by Mr. J. Day, diocesan architect, consists of a large room, 62 ft. long and 28 ft. wide, and two class-rooms 20 ft. by 18 ft. each, with boys' and girls' lobby entrances, hat and cloak rooms, and is erected principally with Bedford red bricks and covered with local plain tiles. The works have been carried out by Mr. Samuel Foster, builder and contractor, of Kempston and Bedford, at a cost of 1,030*l.*

SCHOOL BOARD SCHOOLS.

Gateshead.—New schools in Askew-road have just been opened by the Gateshead School Board. The new buildings occupy a commanding site a short distance to the north of Askew-road, the frontage being to the west towards Ulleswater-street. The schools are arranged in three departments, namely, for boys, girls, and infants, and will accommodate 800 children. The outline of the plan, roughly speaking, is in the form of a letter H, of which the infants occupy the central block, and the boys and girls the end wings. In the rear of the schools are large playgrounds, with covered playsheds and conveniences for the three departments; and at the south-west corner of the site, detached from the main buildings, a caretaker's house of four rooms with separate yard and offices and garden space in front have been provided. The boys' and girls' schools and class-rooms are arranged upon the "single principle," with seats three deep upon one side only, the rooms being 21 ft. wide. The heating is effected by means of hot water in pipes and coils, supplied by Messrs. Walker & Emley, Newcastle. Externally the schools are constructed of brick with stone dressings and slated roofs, and a lofty bell turret rises from the centre of the main block. The late Mr. Joseph Lee was the contractor for the whole of the works. The sub-contractors under Mr. Lee were as follow:—Mr. Grisdale, carpenter; Messrs. R. B. Charlton & Co., plumbers; Messrs. Kirk & Brown, slaters; Mr. Rule, plasterer; Messrs. A. Robertson & Son, painters and glaziers; and Mr. Marley, ironfounder. The whole of the school furniture has been supplied by Mr. John Bowman, of Newcastle. Mr. Lee's contract for the buildings amounted to 6,202*l.*, which equalled a cost of 7*l.* 15*s.* per child. The cost of land, furniture, &c., made the total expenditure amount to about 10*l.* per child. Mr. Edington has acted as clerk of the works, and the buildings have been designed and carried out under the superintendence of Mr. Thomas Oliver, architect, Newcastle.

Denham.—New Board Schools have just been completed upon a site of half an acre in Cheapside, Denham, near Slough. They consist of separate school and class rooms for boys and girls, and infants' school, with master's residence and offices, accommodation being provided for 240 children. The materials used are stock brick, with dressings of red brick and Box-ground stone; the roofs are tiled. Internally the woodwork is stained and varnished, and the walls are painted up to the level of the window-cills. The school and class rooms are heated by the Manchester school grate. There are separate playgrounds, with boundary-walls and iron gates. The contract was taken by Mr. F. Taylor, of New Windsor-street, Uxbridge, for 2,340*l.*, and there have been no extras. The architect was Mr. R. Groom, of London.

Books Received.

Leaves from my Sketch Book. By E. W. COOKE, R.A., with Descriptive Letterpress. Second Series. London: Murray. 1877.

THE sketches in the present volume, twenty-five in number, include fifteen on the Nile, the remainder illustrating Venice and Naples. One in Venice, "The Riva dei Schiavoni," shows admirably some of the principal points in that magical city. On the right the Campanile of St. Mark, the Palace of the Doge, the Ponte della Paglia, the two well-known columns, and the Library of St. Mark; while on the left is seen the imposing Church of Sta. Maria della Salute. Another sketch from the same city, "The Evening Cloud, Venice," is almost a picture in its effect, and recalls to us forcibly a well-remembered sunset seen in the part of the city where,—

> —"from out the waves her structures rise,
> As from the stroke of the enchanter's wand."

Most of the other sketches are slighter, but all are touched in with infinite grace and truthfulness. Mr. Edward Cooke's power of work is something marvellous. "The Exhibition" never opens without a number of fine pictures from his easel; a thousand miles are no obstacle if a new fern is to be obtained; a run up the Nile is taken year by year almost as a matter of course; his collections of old glass and other things of beauty are well known, his presence at the *conversazioni* and other meetings of the season is seldom missed (though he would be very much missed if he were not present), and his sketches are, literally, to be counted in thousands. Few men have friends so numerous and so attached.

The Great Painters of Christendom, from Cimabué to Wilkie. By JOHN FORBES-ROBERTSON. Illustrated. Cassell, Petter, & Galpin; London, Paris, and New York.

MR. FORBES-ROBERTSON'S large volume, to which we have already alluded, is a very favourable specimen of the class of publications which are commonly spoken of or advertised as "Christmas gift-books," and in which a main object is an attractive and handsome appearance, such as will render them suitable as ornamental works to be placed on a drawing-room table. It deserves to be so characterised, not only because it is really very well got up in every way, but because the book is of use in itself, and is by no means so merely ornamental as many other publications of the same kind. It really might be termed "a dictionary of great painters," consisting of a series of short articles giving the main facts about the life and works, and the place occupied in art, by each of the painters included in the list; but it is a dictionary in a much more attractive form than dictionaries usually present. Each article is illustrated by engravings of two or three of the leading works of the painter who is the subject of it, and in many cases by a portrait also: the average of the engravings is up to a good mark, and many of the larger and more important ones are highly-finished works, and give a very good idea of the paintings which they represent. The book does not, as we take it, profess to solve any disputed question in regard to art criticism or art history, but simply to give in a concise and readable form an estimate of the genius of each painter as generally regarded from the point of view of the average of educated lovers of art. Many persons who have not time or opportunity for studying the productions of the art of painting in a more systematic and detailed manner, may find it extremely useful to have at hand a book which will give them in a moment the leading particulars about any great painter on whom they may want a little information, and will briefly remind or instruct them as to his prominent characteristics and favourite subjects, with an illustration or two to assist the description; and the value of the book will not be lessened by the fact that it is a handsome object in itself, printed on beautiful paper and with an artistically-designed cover. Looking through the remarks on the various painters included, we can speak in praise of the general correctness, clearness, and impartiality of the judgments passed on each painter, and the estimate given of his place in the art. We only noticed one decided exception to this rule, in regard to the remarks on Blake. Some of the inherent defects in Blake's art are quite rightly stated, but the author seems to have no perception of the wonderful genius which lightens through their often strange and even grotesque forms of expression, and which has commanded the enthusiastic reverence (it is not too strong a word) of artists who are fully alive to Blake's technical defects; in fact, he misrepresents Blake very much. With this exception, his book is a very good guide to general readers in an estimation of the characteristic qualities of the great painters of Christendom, and as such deserves a good circulation.

Town-hall Competition, Reading.—The design marked "Grosvenor" has been placed first by the committee. The author of it is Mr. William Thomas Sams, the architect of the Grosvenor Gallery.

Miscellanea.

Pervious and Impervious Walls.—Professor Marcker and Dr. Berthold have made a series of experiments in Paris to determine whether the substances used in the construction of our houses allow the passage of noxious gases. They found that bricks, sandstone, and shelly tufa, mortar, and cement, when not kept under water, permit vapours to pass through them very freely, while granite, porphyry, slate, limestone, marble, and alabaster are absolutely impermeable. As in many countries the dwellings are constructed principally of brick,—as in England,—or of sandstone, according to the nature of the strata in the district from which stone can be procured, and cellar floors are almost invariably laid with brick,—tiles are the same thing,—or cement, the fact is clear that a vast number of persons reside in places which afford them no protection from injurious effluvia. The inconvenience or danger may be lessened to a considerable extent, even with those porous walls. Thin paper-hangings reduce the penetrability of mortar 17 per cent., and thick glazed paper 40 per cent., but white-washing and lime-whiting not at all. But a double coating of oil-paint renders them absolutely impassable to any deleterious emanations. However, the principal attention should be paid to the cellars, for the fact has been proved that the noxious vapours from sewers,—almost always built of brick,—do find their way through a very considerable thickness of earth, and enter our dwellings in a sort of continuous stream.

Corporation Property.—At the Newcastle Police-court, before Mr. Ald. Hedley and Mr. W. H. Stephenson, two little girls named Sarah Bowes and Mary Ann Cunningham, were summoned for depositing nightsoil in a grating at the west end of Sandgate, on the 1st inst. A police-constable having proved that the defendants committed the offence, Acting-Superintendent Pringle, in reply to the Bench, said the property in which the girls lived belonged to the Corporation, and there was no place of convenience. Mr. Ald. Hedley remarked that Mr. Pringle had better see Mr. Curry, inspector of nuisances, and ascertain why a proper place of convenience was not provided, and if that were not done a summons should be taken out against the Corporation. The cases were then dismissed. A woman named Annie Christie was summoned for a similar offence. In answer to Mr. Ald. Hedley, she said there was no convenience provided in the property in which she lived. She resided in Sandgate, and she was sure there was no convenience from the Milk Market to the Swirle. Mr. Pringle said there used to be one at the top of Mackham's Chare, but the nearest one at present was at the top of Causey Bank, a considerable distance from the Milk Market. Mr. Ald. Hedley, in dismissing the case, said they would try if they could get the Corporation to provide some place. Has Newcastle a Medical Officer of Health?

Water Supply.—At the half-yearly general meeting of the Southwark and Vauxhall Water Company, on the 13th inst., Mr. Henry Whiting, the chairman, said a matter of which the shareholders were all aware was that the Metropolitan Board of Works were about to apply to Parliament for two Bills—the first to purchase the interest of existing water companies, and the second to enable them to give a new and independent supply of water for drinking and culinary purposes, the extinguishing of fires, and the construction and maintenance of works in connexion therewith. The latter scheme would cost some millions of money, would increase the present water-rates, and would also involve the opening and rearranging of the present pipes, fittings, &c., and would cause a great deal of annoyance to every householder in laying on an additional supply of water. Being anxious to avoid a heavy revenue expenditure in a Parliamentary contest without having ascertained the wishes of the shareholders, the directors would take an early opportunity of asking the shareholders' opinion whether under the circumstances they should act jointly with the other companies, or take an independent stand.

Shutters.—Messrs. Clark & Co. are fixing at the New National Dock at New York two of their patent noiseless steel shutters, 16 ft. 4 in wide by 17 ft. high. The same firm are also fitting about fifty of the same class of shutters to the entrance of the Trocadéro Palace, the Gallery of Fine Arts, and the Machinery Gallery of the Paris Exhibition.

British Archæological Association.—During the meeting of this Association, held on the 5th inst., the discovery of three Roman villas was reported, in addition to the important excavations at Templeborough. The first of these is at Abinger, near Dorking, in a district not hitherto remarkable for Roman remains, notwithstanding the proximity of the Stane-street-road. Traces of several chambers, with tesselated pavements, have already been met with. The second is at Itchen Abbas, Hants, and Dr. Stevens reported that some trial excavations have shown the existence of two tesselated pavements, and a system of heating almost perfect. The uncovering of these buried remains promises results of interest. Dr. Stevens, in a paper read by Mr. Previté, gave a fully detailed description of a third villa at Preston, near Brighton. Here several apartments were opened, and various antiquarian relics found, many of which are now in the Brighton Museum.

The late Mr. Wornum.—On the 15th inst., at No. 20, Belsize-square, died Mr. Ralph Nicholson Wornum, Keeper and Secretary of the National Gallery, in his sixty-fifth year. Mr. Wornum was a large and useful contributor to the literature of art. Educated at the London University, he went abroad in 1834 to study painting, and on his return wrote largely in various periodicals. In 1846 he was employed to prepare the official catalogue of the National Gallery, and in 1857 was appointed Keeper and Secretary. He published in the meanwhile a compact little "History of Ancient and Modern Painting," and acted as Lecturer on Art to the Government Schools of Design during one period of their chequered existence. Afterwards he issued a "Biographical Catalogue of the Principal Italian Painters," and a "Life of Holbein," and edited, amongst other works, "Walpole's Anecdotes."

Beccles.—At a meeting of the Beccles Town Council on the 6th inst., the committee appointed to consider applications from candidates for the surveyorship, vacant by the death of Mr. G. Fenn, reported in favour of the appointment of a surveyor whose age should not exceed fifty-five, and who should perform the duties of his office personally and not by deputy. The duties proposed by the committee, and elaborately set forth, were agreed to by the council, though one or two members expressed an opinion that it would be impossible to get a suitable man at the money, 75*l.* a year. Councillor Crisp proposed that the council should give 100*l.* a year, and require the whole services of the surveyor, but this was negatived, it being the opinion of the majority that there was not sufficient work to require the entire services of the surveyor. The Council will make the appointment on the 1st of January by ballot.

Fatal Accident in Kentish Town.—Dr. Hardwicke held an inquest at the University Hospital on John Davey, aged thirty-one, an engine-fitter's labourer, in the employ of the Midland Railway Company. On Monday morning last he with others, under the direction of a foreman, named Elliott, was engaged in lifting an engine for repairs at Kentish-town depôt. The hook to which the engine was slung on being lifted, broke, a portion falling on to the head of the deceased, who expired the same evening from the injuries. The weight being lifted was from twelve to fourteen tons. The size of the hook at the fracture was about seven square inches, and according to authority one square inch of metal was capable of lifting 64,000 lb. weight, and therefore the strain on the hook was comparatively light. The hook having been impounded, the jury returned a verdict of "Death from accidental causes."

Lamplighters Superseded.—The ignition of gas-lamps by an electric current has long been adopted in some large public buildings, and the application of the same system to street lamps has frequently been suggested. The method consists in intercepting the electric current by a piece of platinum adjusted over the nipple of the lamp. This becomes red hot and ignites the gas. It is said that in the city of Providence some 220 lamps, extending over a line upwards of nine miles in length, have been electrically connected, and can now be lighted instantaneously, or nearly so, by one man. The system, we are told, has been in operation for some months, and its extension to the 2,500 lamps in Providence is contemplated. It is estimated that a saving of $25,000 a year will be the result, an economy of gas as well of labour being effected by the arrangement.

The Telephone.—On Wednesday evening last Professor Bell gave a second lecture before the Society of Arts on the Telephone. The meeting was held in the hall of the Freemasons' Tavern, in consequence of the large attendance expected, and the chair was taken by Lord Alfred Churchill. The hall was crowded, but a large number of those present heard nothing. Great annoyance was caused by allowing visitors to *stand* in the central avenue.

Over.—A stained-glass window is about to be placed over the western entrance of St. Chad's Church, Over, Cheshire, the subject of which is to be the Ascension. It is the gift of Miss Davenport, of Barton-upon-Irwell, in memory of her parents.

TENDERS.

For corner house, Lewisham Park, S.E. Mr. Horace T. Bonner, architect. Quantities supplied:—

Penny	£2,500 0 0
Bishop	2,486 0 0
Downs	2,428 0 0
Kirk	2,387 0 0
Staines (accepted)	2,298 0 0
Sheffield & Prebble	2,294 0 0
Lyons	2,290 0 0

For alterations to the Prince of Wales, Leyton-road, Stratford, for Mr. J. Brewer. Mr. Edward Brown, architect:—

Stamp & Bowtle	£529 0 0
Harbert	350 0 0
Webb (withdrawn)	173 0 0

For alterations at the Royal Oak Public-house, Regent-street, Westminster. Mr. H. W. Budd, architect:—

Godden	£393 0 0
Hockley	259 0 0
Lamble (accepted)	238 0 0

For alterations at the Rising Sun, Fulham, for Mr Wright. Mr. H. J. Newton, architect:—

Hockley	£377 0 0
Smith	350 0 0
Godden	300 0 0
Lamble (accepted)	289 0 0
Bar Fittings.	
Lamble (accepted)	140 0 0

For enlargement of workmen's lodging-house, Nuns-street, Derby, for the Midland Improved Industrial Dwellings Association (Limited). Mr. Geo. R. Iaborn, architect. Quantities supplied:—

Thompson	£1,280 0 0
Hind	1,265 0 0
Dennett & Co.	1,252 0 0
J. Wood	1,250 0 0
Bakewell	1,239 0 0
E. Wood (accepted)	1,178 0 0

For new workhouse, Pontardawe, Glamorgan. Mr. J. B. Fowler, architect. Quantities supplied by Mr. S. J. Rooney:—

Morgan	£15,343 0 0
J. Thomas (Neath)	15,234 0 0
Mercer & Lintoff	14,194 0 9
J. Thomas (Cardiff)	13,875 15 3
Jones & Co.	12,564 0 0
Stephens & Bastow	11,999 0 0
David	11,161 0 5
White	11,000 0 0
Watkins & Jenkins	10,700 0 0
Jenkins & Williams	10,677 0 0
Rees	10,009 0 0
Griffiths	9,506 0 0
Rees (accepted)	8,882 0 0

For Workmen's Rest and Temperance-hall, Holloway, Bath. Messrs. Hay & Oliver, architects. Quantities by Mr. A. Deane:—

Stephens & Bastow	£1,799 0 0
Eastabrook & Sons	1,590 0 0
Ambrose	1,503 0 0
Morris & Son	1,490 0 0
Long	1,466 0 0
Bladwell	1,398 0 0
Hill & Gay	1,390 0 0
Morgan & Lovell (accepted)	1,381 8 0

For new schools, Greystoke-place, Fetter-lane, for the School Board for London. Mr. E. R. Robson, architect. Quantities by Messrs. Gardner, Son, & Theobald:—

Browne & Robinson	£7,350 0 0
Tongue	7,148 0 0
Williams & Son	7,145 0 0
Hobson	7,078 0 0
Roberts	7,070 0 0
Clarke & Bracey	7,050 0 0
Brass	6,991 0 0
Nightingale	6,972 0 0
Jerrard	6,958 0 0
Wall, Brothers	6,932 0 0
Lawrence	6,918 0 0
Grover	6,775 0 0
Pritchard	6,775 0 0
Downs & Co.	6,594 0 0

For new hotel, Great Marlow. Mr. W. H. Powell, architect. Quantities supplied:—

Kempsell	£7,830 0 0
Langley	7,625 0 0
Carter	7,300 0 0
Stephens & Bastow	6,999 0 0
Carter & Son	6,999 0 0
Woodbridge	6,910 0 0
Lovell	6,730 0 0
Kearley	6,540 0 0
Gibson	6,275 0 0